JANUARY 1960

CHEMICAL PROCESSING

Process dynamics heralds "revolution" in basic CPI concepts **21**

Bubble chambers teamed with Cosmotron add impetus to research .. **68**

. . . also more than 250 terse reports on new processing techniques, chemicals, instruments, equipment . . . 6

RESEARCH
◀ Kinzel Boundy ▶
"more productive"

TECHNOLOGY
◀ Moffitt Engs ▶
"dynamic growth"

ECONOMY
◀ Ellis Geiger ▶
"challenging decade"

FOREIGN EXPANSION
Hesse ▶
"growing investment"
Jolles ▼

SALES & MARKETING
Bates ▶
"increasing problems"

FINANCE
Schneider ▶
"bright outlook"

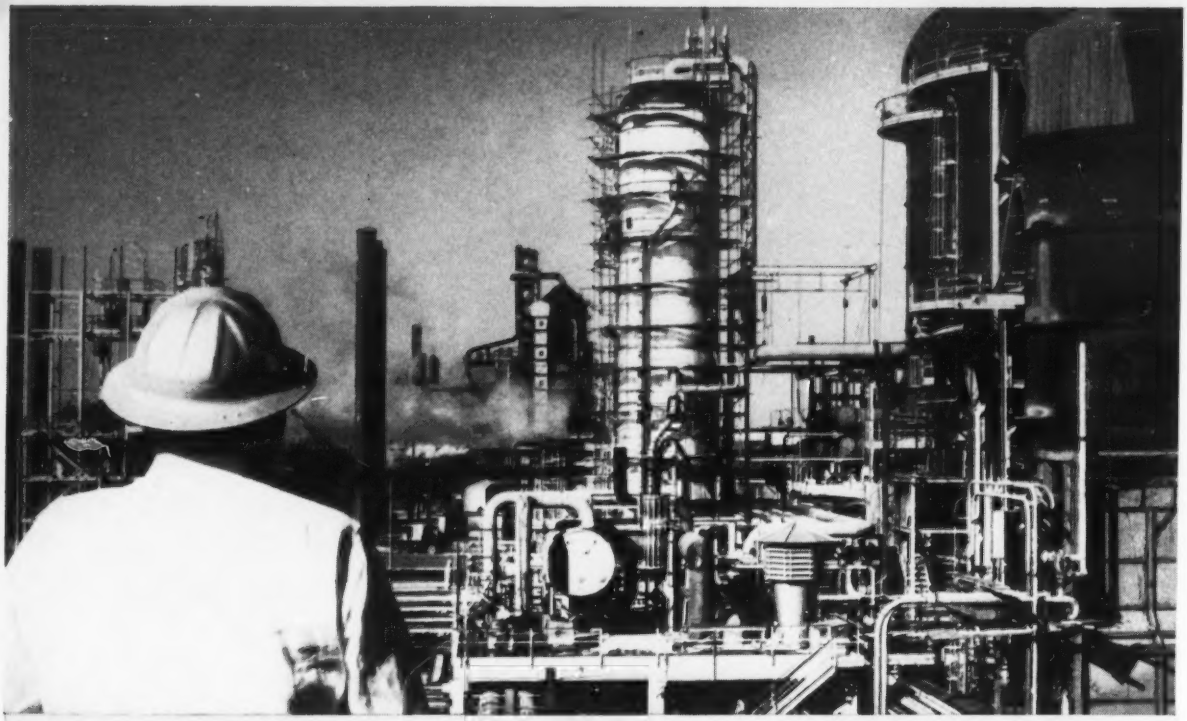
CHEMICAL MATERIALS
◀ Vila
"continued boom"

CPI Leaders Look Ahead to

THE GOLDEN 60's

Beginning on Page 24

PUTMAN PUBLICATION
ecutive Magazines for Industry"
.00 the copy



PROBLEM: An effective solid catalyst was sought for the alkylation of isobutane with ethylene to produce diisopropyl, a high octane gasoline component valuable for its high lead susceptibility and excellent volatility.

SOLUTION: Use of BF_3 with certain hydrated salts produces active alkylation catalysts which bypass many problems encountered with known catalysts. These new catalysts can be used at low temperatures—thus avoiding undesirable side reactions and mixing problems due to changes in viscosity.

NEED A BETTER CATALYST?

INVESTIGATE B&A® *BORON TRIFLUORIDE*

The versatility of boron trifluoride and its cost-cutting advantages make it a catalyst to be considered in almost any organic synthesis problem. The use of BF_3 as an alkylation catalyst in the preparation of diisopropyl (described above) is an excellent recent example. The next synthesis problem BF_3 will help solve may well be *yours!*

Here are some of the reactions catalyzed by BF_3: polymerization, alkylation, esterification, nitration, sulfonation, halogenation, isomerization, arylation, cyclization, hydration, acylation, and there are more!

Baker & Adamson has long been the leader in BF_3 research and production. We were the first to introduce boron fluoride etherate to industry. We pioneered in shipping the compressed gas by tube trailer transport—making it readily available in large commercial quantities. Steady, dependable supply is assured when you call on B&A for boron trifluoride.

Write today—for technical data on the properties and typical uses of B&A Boron Trifluoride gas or any of its complexes listed. Attach company letterhead, please.

Boron Trifluoride, Di-acetic Acid Complex
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Boron Trifluoride, Ether Complex, Tech.
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Boron Trifluoride, Hexamethylene-tetramine Complex
Boron Trifluoride, Monoethylamine Complex
Boron Trifluoride, Monohydrate
Boron Trifluoride, Para-cresol Complex
Boron Trifluoride, Phenol Complex, Tech.
Boron Trifluoride, Piperidine Complex
Boron Trifluoride, Triethanolamine Complex
Boron Trifluoride, Urea Complex

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Fine Chemicals

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

Check 2737 opposite last page.

conventions and exhibits

January 12-15. Society of Plastics Engineers, Inc., 16th ANTEC, Conrad Hilton Hotel, Chicago, Ill.

January 22. Engineers Joint Council, Annual Meeting, New York City, N. Y.

January 25-28. Plant Maintenance & Engineering Show, Convention Hall, Philadelphia, Pa.

February 1-4. American Society of Heating, Refrigerating and Air Conditioning Engineers, Semi-Annual Meeting, Dallas, Texas.

February 1-4. Instrument Society of America, Instrument and Automation Conference & Exhibit, Sam Houston Coliseum, Houston, Texas.

February 2-4. Fifteenth Society of the Plastics Industry, Reinforced Plastics Division Conference, Edgewater Beach Hotel, Chicago, Illinois.

February 14-18. American Institute of Mining, Metallurgical, and Petroleum Engineers Annal Meeting, New York City, New York.

February 19. The Chemical Institute of Canada, Divisional Conference, Protective Coatings Division, Montreal.

February 21-24. American Institute of Chemical Engineers, National Meeting, Biltmore Hotel, Atlanta, Georgia.

February 22-25. Technical Association of the Pulp and Paper Industry, Annual Meeting, Commodore Hotel, New York City, N.Y.

February 29-*March* 4. The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Exposition of Modern Laboratory Equipment, Penn-Sheraton Hotel, Pittsburgh, Pennsylvania.

March 10-11. The Fiber Society, Spring Meeting, Roosevelt Hotel, New Orleans.

. . . Meetings and shows of interest to the chemical industries

March 14-18. National Association of Corrosion Engineers, National Meeting, Dallas, Texas.

April 3-6. American Oil Chemists' Society, Spring Meeting, Baker Hotel, Dallas, Texas.

April 3-8. 1960 Nuclear Congress, The Coliseum, New York City.

April 5-7. Instrument Society of America, National Chemical and Petroleum Symposium, Rochester, New York.

April 8-9. Society of Plastics Industry, Inc., 17th Western Section Conference, New Riviera Hotel, Palm Springs, California.

April 18-19. Third Annual Conference on Automatic Techniques, Cleveland-Sheraton Hotel, Cleveland, Ohio.

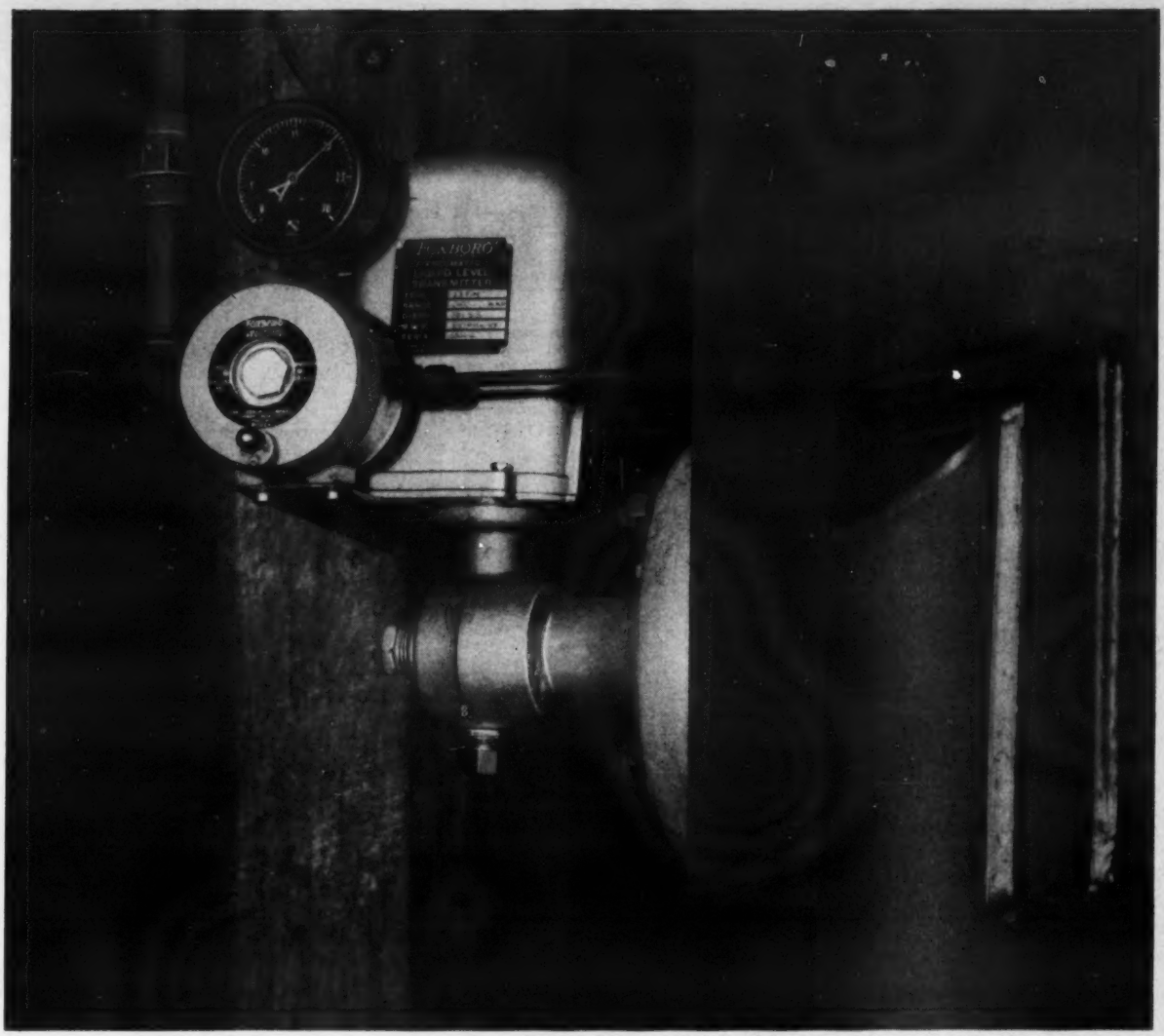
April 27-29. Instrument Society of America, Sixth Annual Southeastern Conference and Exhibit, and First Pulp and Paper Division Symposium, Pensacola, Florida.

May 1-5. The Electrochemical Society, Inc., Meeting, LaSalle Hotel, Chicago, Illinois.

One-day symposium treats computers and economics

Chicago section of AIChE will host a one-day symposium February 23, 1960, at the Palmer House. Computer Control of Process Units will be the topic of the session under the chairmanship of CHEMICAL PROCESSING's editor, John C. Vaaler. A four-man panel is planned, composed of two representatives from chemical producing companies and two from computer manufacturers.

A concurrent session is being organized by W. E. McEachron, Head, Long Range Planning, Standard Oil Co. (Ind.) Topic here will be Engineering Economics.



Foxboro flange-mounted liquid level transmitter on 1st fine fiber wash tank at Union Starch and Refining Company's wet corn milling plant, Granite City, Illinois

UNION STARCH & REFINING REPORTS:

"Faster tank clean-up - less instrument maintenance with Foxboro Liquid Level Transmitters"

"We leave our Foxboro Liquid Level Transmitters right on our tanks at clean-up time," reports Robert Hays, Chemical Engineer at Union Starch & Refining Company, Granite City, Illinois. "The transmitter's flange-mounted, stainless steel diaphragm gets scrubbed right along with the vessel wall — without affecting its high accuracy of performance at all."

Foxboro Type 13 FA Level Transmitters have no floats or bubble-tubes — nothing to corrode or plug-up. 3-15 psi output signal operates standard recorders and controllers without the use of signal converters. And the 13 FA is available with elevated and suppressed ranges when process requirements make these features desirable.

For accurate, trouble-free level measurement and transmission, the Foxboro Type 13 FA Transmitter is your answer. Accurate to ± ½ % on all types of liquids — from water, to highly viscous and corrosive liquids. Ranges from 0-20 to 0-850 inches water.

Ask your nearby Foxboro Field Engineer for full details, or write for Bulletin 458-52. **The Foxboro Company, 811 Norfolk St., Foxboro, Mass.**

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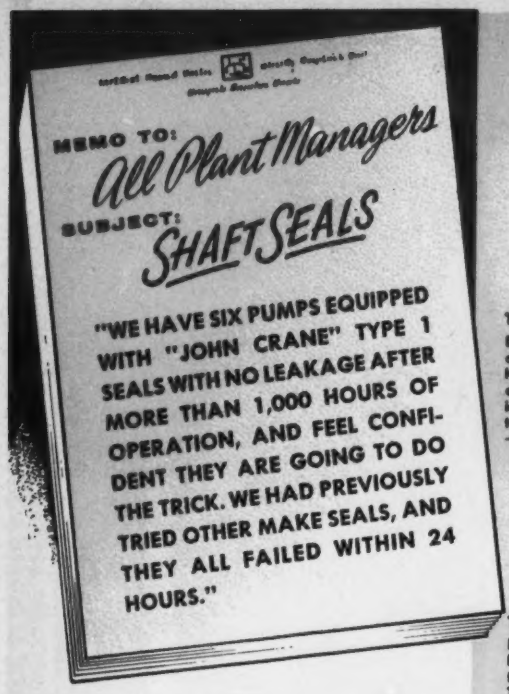
MEMO TO:
All Plant Managers
SUBJECT:
SHAFT SEALS
"WE HAVE SIX PUMPS EQUIPPED WITH "JOHN CRANE" TYPE 1 SEALS WITH NO LEAKAGE AFTER MORE THAN 1,000 HOURS OF OPERATION, AND FEEL CONFIDENT THEY ARE GOING TO DO THE TRICK. WE HAD PREVIOUSLY TRIED OTHER MAKE SEALS, AND THEY ALL FAILED WITHIN 24 HOURS."

This is part of an actual memo sent by one plant manager to others of the same company in different sections of the country—and that company is now exclusively specifying these and other type "John Crane" Shaft Seals for *all* their liquid handling requirements.

You too can save time, trouble and expense by doing likewise.

You'll find a "John Crane" Shaft Seal for every service . . . from hot or cold water to the most destructive acids and corrosives . . . high temperatures, high pressures . . . in types and sizes to meet practically any mechanical or dimensional requirement.

Send us details on your application. We'll recommend the proper shaft seal. Request Bulletin S-204-3 for complete overall information.

Crane Packing Co., 6421 Oakton St., Morton Grove, Illinois, (Chicago Suburb).

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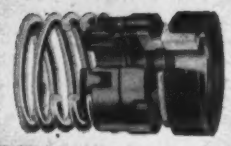
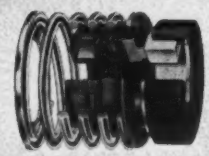


TYPE 1

Designed for limited stuffing box diameter. Handles water, light hydrocarbons, refrigerants, mild acids and other liquids non-injurious to synthetic rubber at temperatures from −40°F. to +212°F., pressures to 200 psi.



TYPE 2

Designed for limited stuffing box length. Handles same services, temperatures and pressures as Type 1.

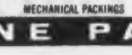
TYPE 8-B

Heavy duty, high pressures. Packaged construction for easy installation. Handles pressures to 1200 psi, temperatures from −40°F. to +250°F. Services same as Type 1.

TYPE 9

Famous as a problem solver. Sealing members of chemically inert Du Pont Teflon. Engineered to service conditions to handle practically all destructive acids, corrosives and gases at temperatures from −120°F. to +500°F., pressures to 150 psi. Available in balanced construction for pressures to 750 psi.

John Crane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THREAD COMPOUNDS

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CHEMICAL PROCESSING

with which is combined
PROCESS DYNAMICS
CHEMICAL PROCESSING PREVIEW
and CHEMICAL BUSINESS

For the management team

More than 50,000 copies of this issue

Vol. 23 January 1960 No. 1

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CHEMICAL PROCESSING serves members of the Management Team in these industries:

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Rubber products
Stone, clay & glass products
Atomic energy establishments

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over the editor's shoulder

What's ahead for 1960 and the 60's

Forecasts comprise much of the business news these days. Top men of the chemical processing field express their views in this issue of CHEMICAL PROCESSING.

Research, technology, sales, production, economic outlook and the foreign picture are all covered in this scrutiny of CPI prospects.

There will be broad technological growth, coming about as a result of cooperation between manufacturer and user. Computer-controlled plant is in the early future. More use of computer—simulated reactions in plant design will lower capital costs.

Competition in the sales picture will be strong, particularly in view of the over-production spectre.

Use of every device to lower sales costs and improve sales efficiency will help in the competitive selling picture. Efficient use of distributors in the marketing picture can also help. Careful analysis of the LCL and LTL user, and how he might be served by the distributor, can show surprising savings in selling and distribution costs.

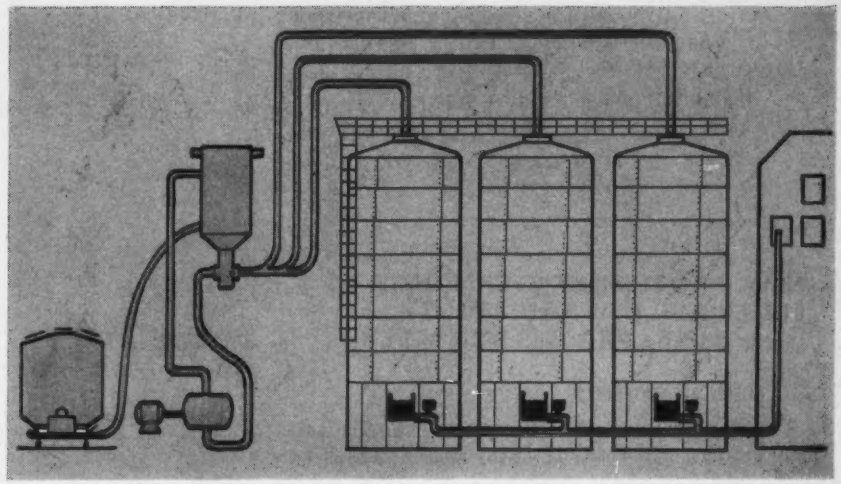
Chemical sales for 1959 were approximately 24 billion dollars. Sales for 1960 may be over 27 billion dollars. Some long-range forecasters predict that within the lifetime of some, the chemical industry will produce 100 billion dollars worth of goods in a year.

We urge that you read "The Golden 60's" by top leaders in the industry, beginning on page 22.

John C. Vaaler

Editor

Here's a "TRIPLE-THREAT" to the high cost of handling bulk materials



Here's a typical vacuum-pressure system for Permaglas Storage Units. A. O. Smith distributors have the "specialized" know-how to plan and help solve your bulk materials conveying problems.

Permaglas® Storage Structures ...mechanical "sweep-arm" bottom unloader ...pneumatic conveying system

Permaglas Mechanized Storage Structures offer a "dynamic challenge" to the higher cost, conventional methods used in handling and storing of bulk materials. You can realize lower costs in your processing operations when *slow and expensive* methods are replaced with *Permaglas* Mechanized Storage Units. Equipped with the *exclusive* "sweep-arm" mechanical bottom unloader, they can be incorporated into an efficient pneumatic or mechanical conveying system. Here's how you benefit:

- A completely enclosed, "push button controlled" bulk materials handling system is now possible.
- Incoming "bulk" cars or trucks can be unloaded pneumatically or mechanically directly into the *Permaglas* Storage Structure.
- The mechanical "sweep-arm" bottom unloader discharges bulk materials directly into the conveying system to the process lines.
- This means substantial savings in labor, eliminates bags, bins, barrels, handling equipment and the maintenance of this equipment . . . eliminates material losses by breakage or spillage . . . helps prevent hazardous accidents.
- *Plus this exclusive feature. Permaglas* Storage Structures are glass-fused-to-steel construction* both inside and out. Makes possible sanitary, easy to clean bulk materials handling systems. Eliminates corrosion, safeguards products from contamination and infestation. Reduces structure maintenance to a minimum.

This low cost way to handle and store bulk materials can be accomplished with minimum capital investment. Certainly it is worth further investigation. Mail coupon for details.

Through research ...a better way

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Send me free Permaglas Mechanized Storage Unit Bulletin MU-100.

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Company.....
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highlights

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CHEMICAL PROCESSING

JANUARY 1960
VOLUME 23 • NUMBER 1

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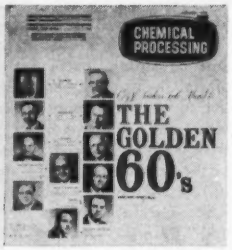
THIS MONTH'S COVER

This month 11 CPI executives, each an authority on some facet of industry, herald the beginning of a new year and a new decade by expressing their views as to what 1960 and the ensuing years will bring in their respective fields. Our headline "The Golden 60's" sums up these conclusions which are expressed in more detail with articles by each in a feature beginning on page 24.



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SPECIAL READER SERVICES

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• To subscribe to this magazine see reader-qualification form opposite last page

Spotlight On People

Appointment of four executives is announced by Cary Chemicals Inc. PHILIP R. SCARITO is made vice president in charge of compounding and calendering at the East Brunswick, N. J., plant; JAMES C. HAHN is appointed vice president in charge of the Polymer Division at Flemington, N.J.; JOHN C. KANCYLARZ is the new assistant vice president, director of public relations and personnel, and RAYMOND T. BOHN JR. becomes works manager at the Flemington plant.

JOHN GARIZIO is appointed vice president of the Reheis Company, Inc. and will continue as assistant to the president.

National Carbon Company, division of Union Carbide Corporation, announces appointment of WALTER A. STEINER as vice president — technology. He has been vice president — development since 1954, and now will be responsible for both research and development activities.

Vitro Chemical Company, newly formed subsidiary of Vitro Corporation of America, has promoted three Vitro Corporation executives. RICHARD C. COLE, former president of Vitro Uranium Company, becomes vice president in charge of manufacturing of the new company; PAUL R. KRUESI, former general manager of the Rare Earths Division of Heavy Minerals Co., is named vice president, research and development, and MALCOLM H. MCALLISTER becomes vice president of the chemical company. He will continue as president of Berkshire Chemicals, Inc. a Vitro sales subsidiary.

Gates Rubber Company announces promotion of CLARENCE H. MINGLE from director of marketing to executive vice president.

Esso Standard Oil Company announces election of ROBERT O. GOODYKOONTZ, J. PRINCE WARNER and FREDERICK P. HAGAMAN to the board of directors. Goodykoontz and Warner are vice presidents; Hagaman is controller.

VICTOR M. SCHWARTZ is elected a director of Udylite Corpo-

Fire caused by friction spark destroyed top 6 feet of this cooling tower, severely damaging motors, shafts and gear boxes.

Protect your water cooling tower from crippling fire with a Grinnell System!

Water cooling towers are essential in many industries today. But cooling towers can, and do, *burn*! Furthermore, fire may strike when the tower not only is shut down, *but even while it is in use*. One insurance company has stated that nearly half its losses involving towers occurred when the towers were in operation!

Why are cooling towers so vulnerable to fire? Because they are largely made of wood. It is true that when the tower is operating most of the wood is wet. But roof and sides can become excessively dry through exposure to the sun. Also, there is a portion of the tower above the cooling water distribution system that is never wet.

Your best protection against an unexpected blaze is a Grinnell Water Spray or Automatic Sprinkler System. Grinnell will engineer an installation for you that will protect your tower — possibly your entire production program — against fire, no matter how it may start. Common causes of fire include defective wiring, overheated bearings, and lightning. So call in a Grinnell engineer. Let him analyze your needs. Remember, he is well qualified to help you . . . backed by a company with 89 years experience in the fire protection field. Grinnell Company, Providence 1, Rhode Island.

GRINNELL
Fire Protection Systems Since 1870

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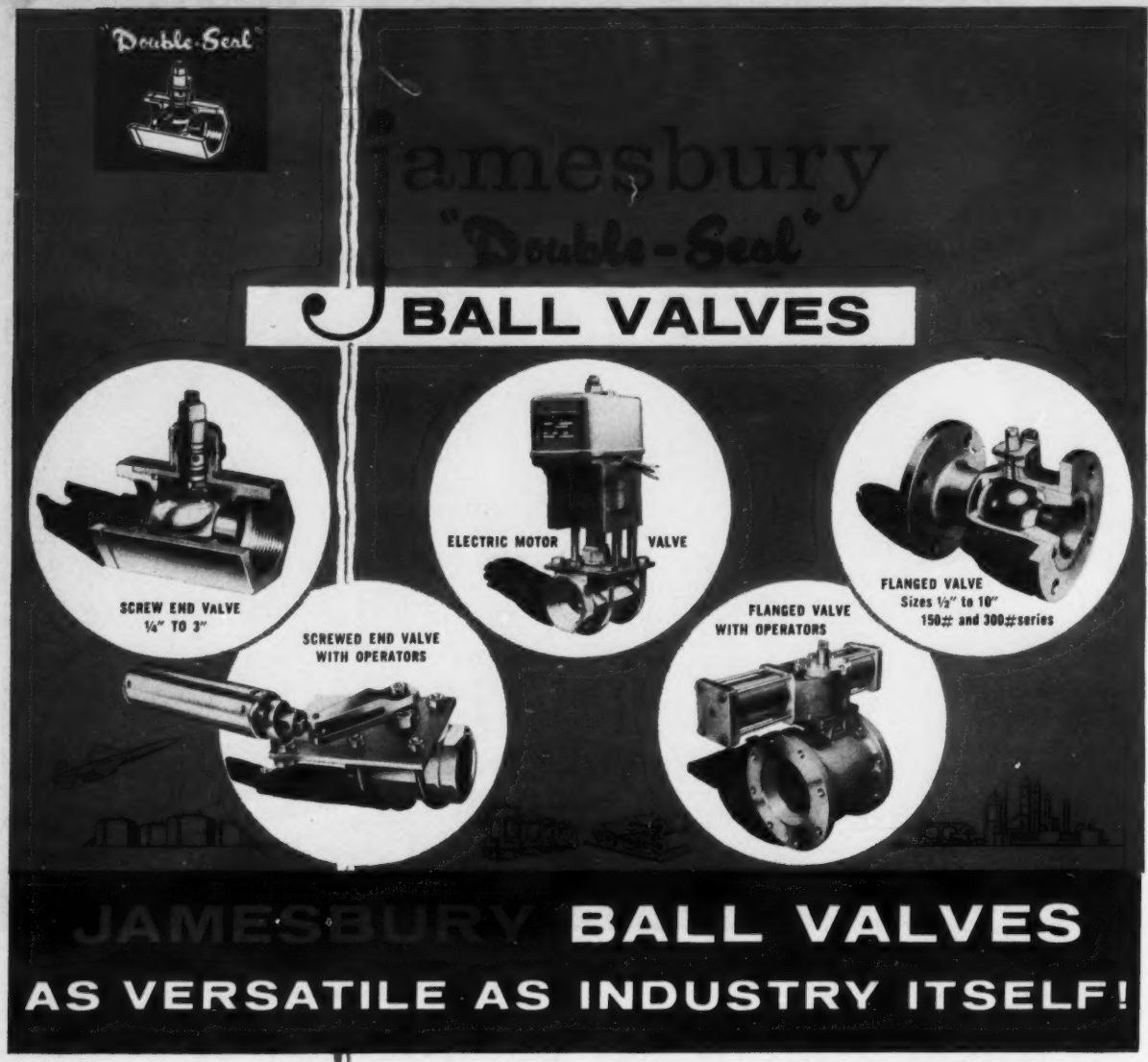


Throughout industry, wherever you look, you'll find the versatility of the Jamesbury Ball Valve doing a more efficient, more economical job.

In chemicals, paper, rubber, petroleum, aircraft, and missiles, Jamesbury Ball Valves handle a wider range of liquids and gases than any other valve design.

Pioneers and Still The Leaders!

Jamesbury pioneered the "Double-Seal" Ball Valve construction and leads the way today with the latest in ball valve design and applications.

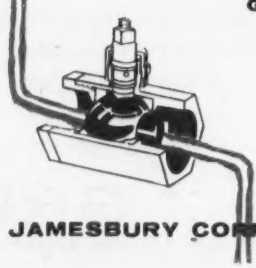
Greatest Range of Sizes and Materials Available

Jamesbury "Double-Seal" Ball Valves are available in 303 and 316 Stainless Steel, Alloy 20, Carbon Steel, Bronze, Ductile Iron, Aluminum and PVC.

Interchangeable seats and seals are available in "Teflon", Nylon, Buna-N, Neoprene, Hypalon and natural rubbers.

Pneumatic, Hydraulic and Electric Motor Operators to fit Remote Control Requirements.

Send for Jamesbury's "At Your Service" Literature



JAMESBURY BALL VALVES... HELPING BUILD OUR NUCLEAR NAVY

JAMESBURY CORP., 64 NEW STREET, WORCESTER, MASS.

Distributors in Principal Cities

348-9

Check 2742 opposite last page.

ration. He is executive vice president and general manager of L. H. Butcher Company, a subsidiary, which is a leading West Coast chemical distributor.

Two changes are made in management of American Cyanamid Company's international operations. SIDNEY C. MOODY, vice president, is elected board chairman of Cyanamid International, Corporation and will continue as the parent company's staff vice president for international relations, and ROBERT C. SWAIN, vice president, is named president of Cyanamid International Corporation and also is appointed director general of Cyanamid International.

ROGER B. SAMMON is elected president of Stein Hall, Ltd., subsidiary of Stein Hall & Co., Inc. He formerly was vice president. DAVID MCGILL, former president, is made board chairman, and ROBERT STRASSER moves from vice president to executive vice president.

At Minnesota Mining and Manufacturing Company, JOSEPH C. DUKE is appointed to the newly created position of executive vice president for sales administration and public relations. C. C. MARCH, formerly vice president for coated abrasives, is named group vice president succeeding Duke. J. F. WHITCOMB is promoted to general manager of the coated abrasives division.

At U. S. Borax Research Corporation, DR. D. S. TAYLOR is appointed president and DR. C. L. RANDOLPH is named vice president.

DONALD G. STURGES, associate director, is named director of research and development of The Carborundum Company. He moves into the post vacated by the resignation of MAJ. GEN. LESLIE E. SIMON, U. S. Army (Ret.) for reasons of health. General Simon, also a vice president, becomes staff director of research and development, acting in a consulting capacity to the president. COL. PAUL N. GILLON, U. S. Army (Ret.), manager

of the basic research branch of the Research and Development Division, is the new director of research and development for Carborundum International S. A., Geneva, Switzerland.

W. C. FRANKLIN is named manager of the newly organized Polychemicals Department of Texas Butadiene & Chemical Corporation.

At Escambia Chemical Corporation, ERHART K. DRECHSEL is promoted to manager, new product development, Commercial Development Dept.

GEORGE F. FOY is named to the newly created position of commercial development manager for the Chemical Products Division of Chemetron Corporation.

Pittsburgh Coke & Chemical Company announces A. X. HILTGEN has been promoted to sales manager of the Activated Carbon Division, and G. J. ESSELEN has been named sales manager of the Industrial Chemicals Division.

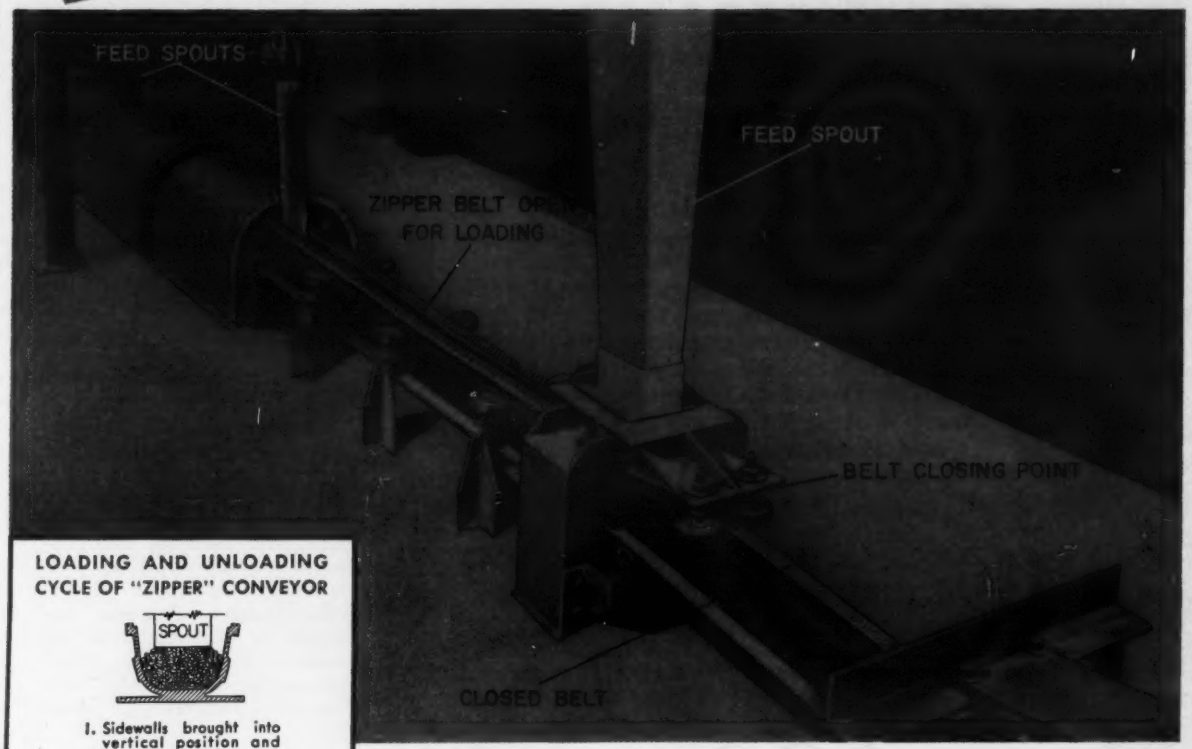
DR. CHARLES F. JELINEK is appointed manager of new fields research at General Aniline & Film Corporation's Central Research Laboratories. He replaces DR. JOSEPH M. WILKINSON JR., recently promoted to director of development of the newly created corporate Development Department.

WILLIAM H. RODEWALD is named vice president and general manager and KENNETH L. RUSS is appointed sales manager of Nalco de Venezuela, C. A., wholly owned subsidiary of Nalco Chemical Company.

STEPHENS-ADAMSON

EXCLUSIVE

"ZIPPER"* CLOSED-BELT CONVEYOR-ELEVATORS

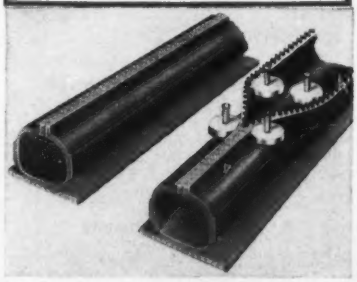


LOADING AND UNLOADING CYCLE OF "ZIPPER" CONVEYOR

1. Sidewalls brought into vertical position and ready for loading.

2. Flexible tube completely closed for conveying and elevating.

3. Rubber ZIPPER belt open for discharge, cleaning and return run.



Upper left unit closed and loaded. Lower right shows how belt is opened and closed by system of ball bearing rollers. (Rollers are mounted on a rigid framework)

CONVEYS AND ELEVATES BY CONTINUALLY WRAPPING MATERIAL IN A PACKAGE... MOVING THE PACKAGE AND ITS CONTENTS TO A NEW LOCATION AND GENTLY UNWRAPPING IT!

Literally a moving material-carrying conduit, the ZIPPER Conveyor is capable of transporting bulk materials in any plane, to considerable heights and around obstructions. Its great advantage is that bulk materials may be conveyed within the belt completely sealed and dust-tight. Material doesn't slide, isn't scooped, pushed or thrown but is gently carried over great distances without breakage, agitation or segregation. The ZIPPER Conveyor-Elevator provides versatility of layout and profitable material handling advantages you won't want to overlook.

*PATENTED

WRITE FOR BULLETIN 349

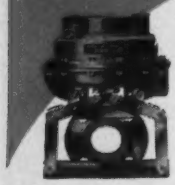
S-A

ENGINEERING DIVISION
STEPHENS-ADAMSON MFG. CO.
GENERAL OFFICE & MAIN PLANT, 11 RIDGEWAY AVENUE, AURORA, ILLINOIS
PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

Check 2743 opposite last page.

In the Process Industries—

Wet or dry—
It will flow through a
FLEX-VALVE



Nothing surpasses Farris Flex Valves for efficiency and reliability when you're moving corrosives and abrasives through process lines. Unlike other valves, Flex Valve becomes an integral part of your pipe line with **full pipe capacity** . . . with nothing to block flow . . . with no internal parts! Flex Valve is the simplest valve made—**guaranteed** not to plug!

Why buy a valve that is a compromise? Specify Flex Valve—the original, the only valve with full opening, no obstructions. Nothing less will give you maximum operating results.

USE FLEX VALVE FOR: Ammonia • Abrasive water slurry • Acetic acid slurry • Bordeaux mixtures • Butyral flakes • Chlorinated solvents • Carbolic acid, phenol • Copper sulfate and lime • Electrolyte—16% H_2SO_4 • Hydrochloric acid • Hydrofluoric acid • Liquid latex • Muriatic acid • Phosphate rock and sand • Potassium cyanide • Sodium chloride brine • Stannic chloride • Sulphuric acid • Sulphuric Trioxide, dry • Zinc sulphate • and many other uses.

FREE THE COMPLETE STORY ABOUT FLEX VALVE
In two valuable catalogs, covering technical data (FL-1116R) and hundreds of uses for Flex Valve (FL-935). Both yours on request.

PROGRESS THROUGH HONEST PURPOSE
Farris

Over 25 Years in Industry's Toughest Service
FLEXIBLE VALVE CORP.
505 COMMERCIAL AVENUE, PALISADES PARK, N. J.
IN TEXAS: 5405 CLINTON DRIVE HOUSTON 20
AFFILIATES: FARRIS ENGINEERING CORP. • FARRIS PICKERING GOVERNOR CO., INC. • FARRIS ENGINEERING, LTD. (England)
Representatives in All Principal Cities

Check 2744 opposite last page.

Chemicals Aid 'Outside' Firms to Greater Sales and Earnings

WILLIAM R. WHITE, Market Analyst
Hornblower & Weeks

Numerous advantages enjoyed by chemical producers—such as relatively low labor costs and rapidly growing consumer demand—that have appealed to conservative investors have not gone unnoticed by corporations representing a variety of other industries.

Consumers of basic chemicals, for example, have undertaken vertical integration to obtain economies in raw material costs. Some manufacturers have stressed consumer goods utilizing surplus chemicals.

Intensive research and promotion of new products have enabled progressive managements in seemingly unrelated lines to attain above-average sales and earnings improvement through exploitation of previously untapped chemical markets. Progress enjoyed by representative petroleum companies in petrochemicals was discussed previously (December CP, page 11).

Impressive recovery experienced in 1959 by Atlas Powder Company stemmed in large measure from chemicals. New chemical items introduced in the last year contributed to an encouraging upturn in sales despite contraction in mining. Volume in explosives, representing about half of normal sales, fluctuates with business trends in construction, mining and petroleum.

Sales in 1959 are estimated to have approximated the 1957 record of $71.7 million, and net profit may have approximated $5 a share, compared with $3.80 in 1958.

B. F. Goodrich Company

B. F. Goodrich Company has made outstanding strides in consumer goods. Plastics have become increasingly important. Progress has become so extensive that tires now represent no more than 35 percent of sales, it is estimated. One of the most interesting new items has been Koroseal vinyl plastic especially compounded to react exactly like metal.

Sales are estimated to have reached an all-time high for 1959 in excess of $780 million, while net profit is believed to have approached $4.50 a share, compared with $3.95 for 1958. Optimists are hopeful of an increase in the $2.20 dividend.

National Distillers Corporation

In an effort to stimulate growth, National Distillers Corporation ventured into chemicals several years ago and recently added the word "Chemical" to its title. Diversification has been so successful that chemicals account for about 40 percent of operating profits and may contribute at least half in another few years.

On the basis of favorable results in the first nine months, it was estimated 1959 sales reached a new peak approaching $600 million and net profit may have amounted to about $2.25 a share, compared with $1.76 for 1958.

(For further information on chemical stocks, write Hornblower & Weeks, 40 Wall St., New York 5, N.Y.)

Check 2745 opposite last page.

Knapsack—Griesheim is not in Leverkusen

Dear Sir:

The reports concerning the European market were very interesting and most probably very useful for your readers.

In the section of the report dealing with Knapsack-Griesheim (November CP, page 28), you state that our firm is located at Leverkusen. Actually, we are in Knapsack, a small village near Cologne.

DR. HELLMUT GABLER
Knapsack-Griesheim
Knapsack
Republic of West Germany

Story on spray dryer helpful to company

Dear Sir:

This is a note to let you know that we are gratified by the number of requests for information which we have received, as a result of your article on our spray dryer (October CP, page 32). The article has apparently aroused considerable interest.

J. K. RUSSELL
Assistant General Manager
Lignosol Chemicals Limited
Quebec, Canada

His colleagues uncertain of depreciation definition

Dear Editor:

Referring to your request for opinions on depreciation and tax policy following T. C. Davis' article (September CP, page 30), I asked the first five men that I came to in our laboratory and office "What is depreciation for tax purposes?"

Two had vague and indefinite opinions. Three said "Depreciation is a loss in value" with no great certainty. One of these three, after discussion, said he agreed with me. The other four, of the five questioned, believed me wrong.

My definition of "depreciation" (for tax purposes) is "recovery of the cost of working tools (tools used in the

Industries widest range of Lauryl Sulfates

The

Maprofix

Series by ONYX

The Maprofix series of anionic surfactants . . . for use in dispersing or foaming or surfactant applications. Specially prepared by ONYX, the leader in lauryl sulfate technology. Highly surface active . . . easily soluble . . . excellent chemical stability.

There is a specific Maprofix available for every process or product requiring dense, stable foam or efficient dispersing.

Consult ONYX first on your specific application. Our large and capable research, development and technical service staff will be pleased to review your problems and suggest the ideal MAPROFIX compound to satisfy your every requirement.

Write for free 24-page booklet which describes our line of highly developed surface active agents.

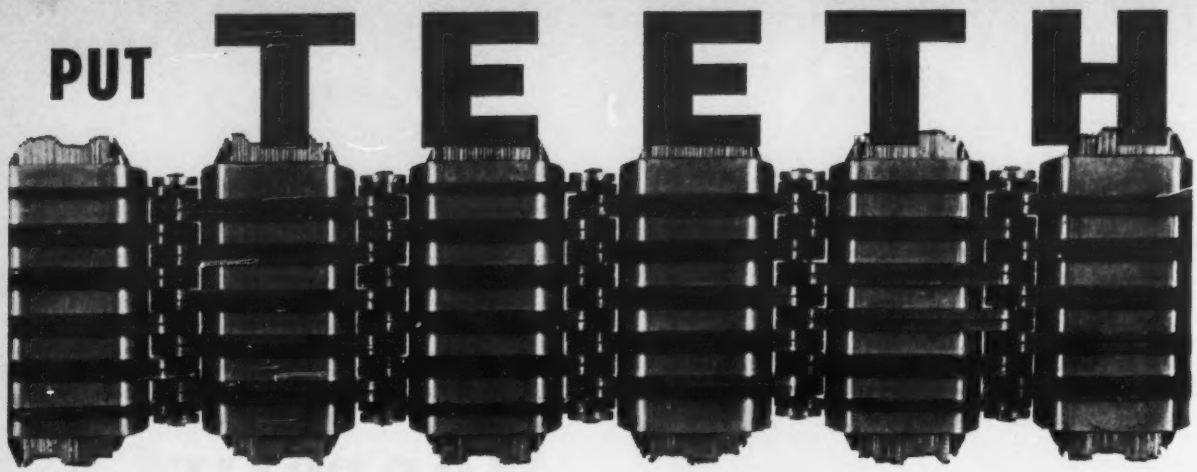
50 YEARS OF SERVICE — ONYX CHEMICALS

Onyx Oil and Chemical Company

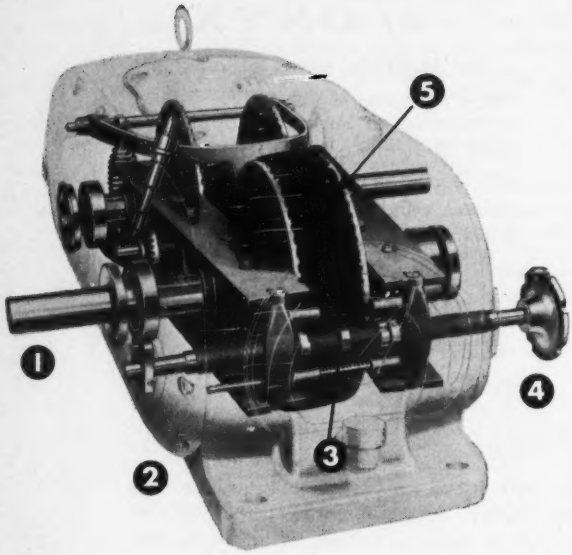
JERSEY CITY 2, NEW JERSEY

Check 2746 opposite last page.

PUT TEETH IN YOUR SPEED CHANGING JOBS



Get the positive, accurate control that only LINK-BELT's chain-driven P.I.V. can deliver



Yes, you put teeth into your speed changing jobs because Link-Belt P.I.V.—unlike other variable speed drives—utilizes an exclusive metal, self-tooth-forming chain.

Here's how it works! P.I.V. chain consists of a series of overlapping steel links. The links contain packs of slats which are free to move from side to side, singly or collectively, to serve as teeth. The chain meshes with radially grooved wheels, which are cut to a constant depth towards the wheel periphery. Beveled sides of the grooves offer gripping areas . . . provide a positive, nonslip contact at any speed, under all loads.

Makes changing speed simple too! A turn of the control screw simultaneously varies the effective diameters of the conically shaped wheels—closing one set, spreading the other. At the same time, the self-tooth-forming chain automatically adjusts to provide desired ratio between the input and output shafts.

BOOK 2274—Your Link-Belt office or authorized stock-carrying distributor has Book 2274 on P.I.V. drives from ½ to 25 hp. Refer to the yellow pages of your local phone directory under Power Transmission Equipment.

(1) You can get minute speed changes and maintain them accurately while operating under full load.

(2) All-metal, totally enclosed—unaffected by atmospheric conditions. All vital operating parts splash-lubricated from a common housing reservoir.

(3) Easy-view speed indicator facilitates speed selection and adjustments to meet all requirements.

(4) An infinite number of positive, stepless speed adjustments may be made with manual, electric, pneumatic or hydraulic controls.

(5) Self-tooth-forming chain is made from a series of overlapping steel links. Links contain packs of hardened steel laminations or slats (shown above). Slats grip toothed wheels positively without slippage —give the speed you need at any setting.

15,249

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

LINK-BELT
P.I.V. VARIABLE SPEED DRIVE

Check 2747 opposite last page.

broad sense, to include buildings, fixed and moving equipment, etc.) from income obtained by use of those tools." Is this definition essentially correct?

Based on this sampling of opinion, we have two definitions of depreciation:

1) Actual loss in value.
2) Recovery of cost of working tools, free of taxes.

If definition No. 1 is regarded as correct, then how are the voter and his representatives justified in setting up rules to allow depreciation greater than actual loss? If No. 1 is accepted, then depreciation must be related to the value of the property.

If vigorous growth of the industrial organizations, and quick adaptation to changed conditions is wanted, then the No. 2 definition should be the basis of rules on depreciation.

Depreciation Objective

Is not the objective and the basic need to be able to recover rapidly the cost of tools? Does loss of value have much to do with it?

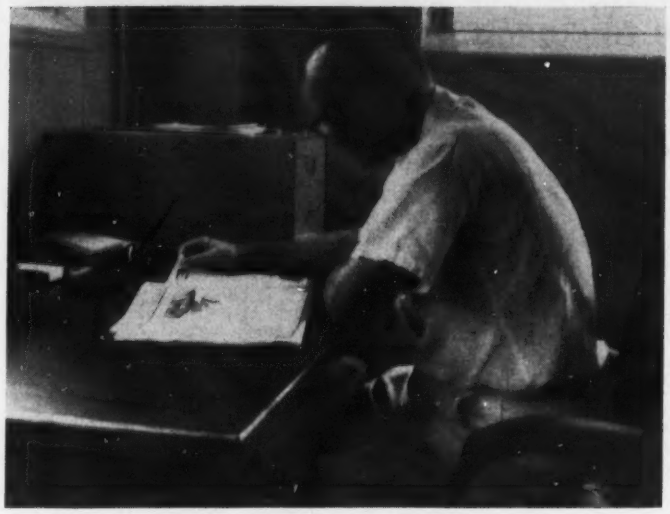
Isn't the problem of industry, insofar as depreciation is concerned, basically one of defining the meaning of depreciation and then getting that meaning recognized? If depreciation is loss in value, the present policies will remain with us, but if depreciation is recovery of cost of tools and equipment free of taxes, then there is hope of change.

If the alternative meaning is to reach the public, then the public will have to be educated to it. To accomplish this, management of industry needs the cooperation and help of men of words in the society. Among these are teachers, preachers, writers, lawyers, politicians and public relations specialists.

Eric Hoffer has said governments of nations are successful only so long as men of words are for those who govern. So, too, it is with industry.

A. M. Cox
Matteson, Ill.

Why They Read CHEMICAL PROCESSING One of a Series



Because it tells about other plants that have the same processing problems as his plant and how they were solved, Dave Hancock, Eli Lilly Supervisor, says CHEMICAL PROCESSING is the —

"MOST INTERESTING MAGAZINE WE RECEIVE"

David Hancock, Area Supervisor, Chemical Manufacturing, Eli Lilly and Company, Lafayette, Indiana, has been with his company 18 years. He started off in Indianapolis and was transferred to Lafayette in February 1958. He is a regular reader of CHEMICAL PROCESSING and has been reading it for 12-14 years.

Here is what he has to say about CP:

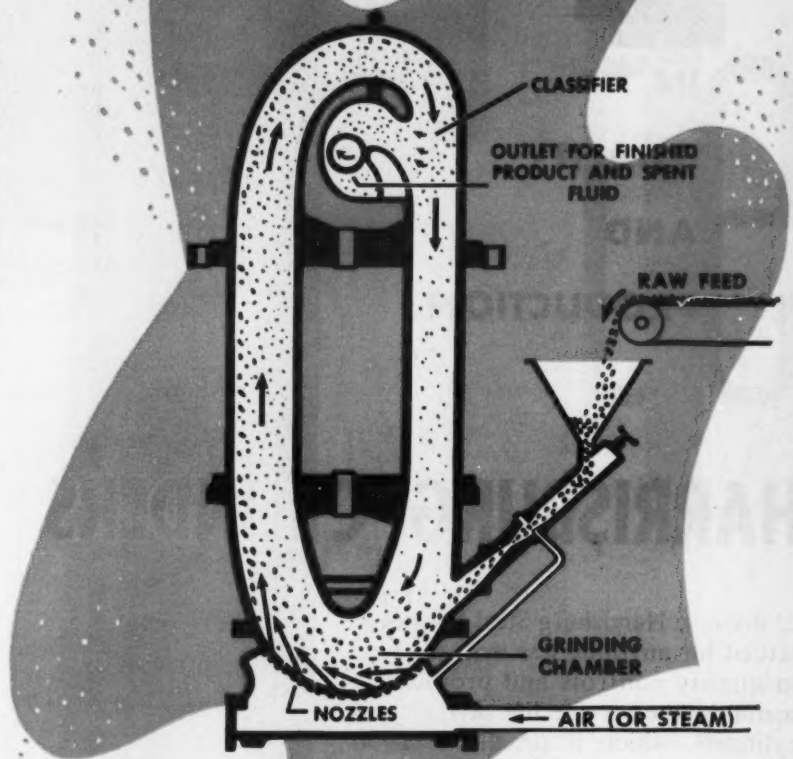
"I think CHEMICAL PROCESSING is the most interesting magazine we receive. It tells about other plants that have the same problems we have and how they solved them. I like to read both the ads and editorial. After I read the publication, it is routed to six other supervisors in the chemical area.

"The articles and ads give me ideas that will improve our operations. I particularly like the sections on instrumentation and corrosion control. Subjects of prime interest to me include those on pumps, filters (always a problem), drying, and metering. I cut out specific articles and keep them in a scrapbook for future reference."

Dave lives in West Lafayette, is married and has two children, both girls. His hobbies include bowling, fishing and reading.

for GRINDING AND DEHYDRATION
FINER PARTICLES
LOW MAINTENANCE

FLUID ENERGY JET-O-MIZER MILLS



The Fluid Energy "Jet-O-Mizer" Mill, designed and built by the pioneers in fluid energy fine grinding, does far more than produce fine particles. It controls fineness and product quality with a narrow distribution range and simultaneously with grinding can dehydrate, coat particles, blend and achieve chemical changes.

Jet-O-Mizer Mills are being used all over the world, processing many types of materials in the following industries:

• Abrasive	• Food	• Pigment	• Wax
• Insecticide	• Mineral	• Plastic	• Metal
• Ceramic	• Pharmaceutical	• Carbon	• Chemical

"Jet-O-Mizing" produces **FINE PARTICLES** ¼ micron average and above **PLUS** . . . Narrow Particle Distribution • Dry, or Controlled Moisture Content • Continuous Operation • Uniformity of End Product • Other Operations with Grinding • No Attritional Heat — No Moving Parts • Low Operating Costs • Low Maintenance

Send for complete information on Fluid Energy's "Jet-O-Mizer" Mills, "Jet-O-Clone" Dust Collectors, and TESTING AND CUSTOM GRINDING services.

FLUID ENERGY PROCESSING & EQUIPMENT COMPANY
Richmond & Norris Streets, Philadelphia 25, Pa. • Phone: Regent 9-7728
(Formerly known as the Wheeler-Stephanoff Mill)

Check 2748 opposite last page.

1ST

IN

QUALITY

AND

PRODUCTION

HARRISBURG CYLINDERS

Because Harrisburg Steel has never settled for anything less than the best in quality controls and production methods, the service life of their gas cylinders, which is usually over 30 years, has become the basis of standards for the industry. No other cylinder manufacturer can make this claim for only Harrisburg and Taylor-Wharton, both divisions of Harsco Corporation, have made cylinders for over 30 years.

More than a Century in Harrisburg 24, Pa.

H HARRISBURG STEEL CO.

Division of HARSCO CORPORATION

TUBES TRANSPORTS FLANGES COUPLINGS

Check 2749 opposite last page.

First Big Petrochemicals Complex in Michigan Dedicated by Dow

Dedication of its new Saginaw Bay Division—the first major petrochemicals complex to be located in Michigan—highlighted a series of recent announcements reflecting continued growth of The Dow Chemical Company.

The new division, situated on a 1400-acre site at the mouth of the Saginaw River on Saginaw Bay, consists of three principal parts.

A petrochemicals plant will produce ethylene, butadiene and other petrochemicals. A polychemicals plant will make polyethylene and polypropylene. The Bay Refining Company will turn out the petroleum raw-material base for the other two operations.

Production of styrene-butadiene latices is scheduled in a new plant Dow will build at Allyn's Point, Conn. The plant is expected to go on stream early in 1961.

Capacity of Dow's Texas Division at Freeport also will be expanded to permit greater production of styrene-butadiene latices.

Dow also has formed a new group—the Industrial Service Division. It will assume solvent cleaning functions performed by the company's Dowell division and will also provide services and products in the municipal and industrial waste and water treatment areas.

Du Pont will build a plant at Belle, W. Va., to make methylamines. The facility will more than double the company's capacity for this compound, now produced at the Houston Works. Construction is expected to be completed in the first quarter of 1961.

The company's Explosives Department has under construction at Beaumont, Texas, a plant to produce acrylonitrile by a new, low-cost process. Operations are scheduled to begin in the spring of 1961.

W. R. Grace & Co.'s Chemical Division has slated a major expansion of its nitrogen plant near Memphis. When construction is completed, capacity will be increased to 160,000 tons of ammonia yearly.

Novamont Corporation will more than double the production capacity of its Neal, W. Va., plant to 25 million lb of polypropylene annually.

Union Carbide Chemicals Company, division of Union Carbide Corporation, has placed in operation facilities at its Institute, W. Va., plant to produce more than 10 million lb of epoxides a year and other oxygenated chemicals.

Borden Chemical Company is erecting its sixth plant on the West Coast, one that will produce approximately 95 million lb of combined resins and formaldehyde a year. A tank car size reactor plant is designed to make 50 million lb of thermosetting resins and thermoplastic emulsions a year. The formaldehyde plant will be capable of producing 45 million lb a year.

Collier Carbon and Chemical Corporation is planning multi-million-dollar facilities near Wilmington, Calif., to manufacture sulfuric acid and ammonium sulfate. One plant will be a contact acid unit which will convert hydrogen sulfide, sulfur and spent alkylation acid into virgin sulfuric acid. The other unit will contain an improved process utilizing fresh acid to produce a premium grade of ammonium sulfate. Both plants are due to be completed late this year.

Monsanto Chemical Company is expanding by 50 percent the production capacity for bisphenol A at its John F. Queeny plant in St. Louis. Work is expected to be com-

FISCHER & PORTER

INSTRUMENTS THAT MEASURE AND CONTROL TEMPERATURE, PRESSURE, FLOW, &c., &c., &c.
have established and maintained their reputation for superiority against all competitors through the years and are in increasing demand. As in the past, it is the unalterable
DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF
THE HIGHEST POSSIBLE QUALITY

THE HANDIEST GUIDE TO THE VARIOUS AND SUNDRY METHODS PRESENTLY AVAILABLE FOR MEASURING FLOW

It has been our pleasure and profit over the years to aid and assist divers engineers in the estimable task of selecting the one—nay, the *only* device best suited to measuring a given flow. But truly, the years have added, the devices have multiplied, and the task of selection has grown ever more complex. As a result, the "handy" guides, so reminiscent of an earlier day have grown less handy all the time. Let us see how handy we can be.

LESSON I

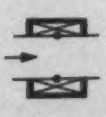
There are but four major types of flowmeters.

1. VARIABLE-AREA (ROTAMETERS)

2. VARIABLE HEAD (ORIFICES, VENTURIS & CO.)

3. INTEGRATING (TURBINE)

4. OBSTRUCTIONLESS (MAGNETIC)



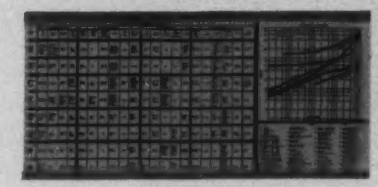
LESSON II

In order to be as handy as possible, we shall limit our discussion of the advantages of the four basic types to a single characteristic benefit.

1. Variable-Area: linear scale
2. Variable Head: flexibility
3. Integrating: accuracy
4. Obstructionless: obstructionless

LESSON III

The lesson to be learned may well be that there is a definite limit to just how "handy" one can be . . . and still serve as a guide. Six pages hold the record at present. We call the guide Bulletin 91-119, but others have called it the first practical map ever published to the land of flowmetering.



LESSON IV

There are those who philosophically oppose all "handy" guides. If you are among that group, we can only state that we make them all . . . every one of the four major types. A call to our technical assistance group will bring you a firm recommendation unencumbered by bias or prejudice.

THE JUSTLY CELEBRATED

MAGNETIC FLOWMETER
OF FISCHER & PORTER
one of the very best flow instruments ever invented

A clear length of pipe that accurately measures liquid flow by the invisible MAGNETIC FIELD!
SOMETHING NEW! Measures the flow of any liquid with a conductivity of no less than 0.1 micromho per centimeter.
Measures flow IN EITHER DIRECTION and without auxiliary equipment.
Handily provides full scale recording of ANY FLOW RATE from 1 to 30 feet per second at the TURN OF A DIAL

extends the ranges of accurate flowmetering to heretofore unbelievable limits!

YOUR ATTENTION INVITED!

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THE PROCESS ACCOUNTANT'S FRIEND

UNMATCHED FOR ACCURACY

There is a reason why the turbine meter is called the accountant's friend. For accuracy over a wide range of flow it knows no equal. As a billing, accounting, or computer input meter it is *non pareil.*

Do You Ask Why?

Each and every revolution of the bladed rotor signifies the passage of a definite unit of fluid volume with an electrical pulse. The total number of counts—or rotor revolutions—is proportional to total volume of fluid passing through the meter in a given time period.

It Is A Friend To All

The selfsame accuracy, reliability, convenience, and compactness which have endeared the Fischer & Porter turbine meter to the arbiters of process economics have made it the meter of the missile and jet man as well. Few indeed are the test stands that do not rely on the turbine meter for critical flow information.

The Fischer & Porter Turbine Meter

Like other F&P meters it is characterized by a perfection of design and manufacture that lifts it from the commonplace and sets it apart in every respect. A thorough study of pertinent data will assure you that this is no mere boast. We shall gladly aid you in such study to the full extent that life and limb permit, if you will but notify us of your interest.

This company, by purchasing the very finest raw glass of the proper composition and reforming it over mandrels of unexcelled strength, durability, and precision, on machines of our own design, and by calibrating and testing them to perfection, are enabled to offer the best

of an unsurpassed excellence at the lowest market rates. The long experience of the present management of the company, and the enviable reputation they have established for F&P FLOWRATORS are deemed a sufficient guarantee that purchasers can at all times depend upon receiving flowmeters unsurpassed by any others for accuracy and dependability.

NEW SNAP-IN FLOWMETER #2700
PUSH DOWN, PULL UP
IT IS ALL SET TO GO
For simplicity, accuracy, and service, it is unequaled; while for outright convenience and economy it excels by a large margin any other flowmeter made.
SAVES USERS 50 TO 75% ON INVENTORY

state your pleasure, gentlemen!

To better acquaint our far reaching public with the BENEFITS and ADVANTAGES of our products we have caused to be printed handsome booklets for the general edification. We will gladly post to you a selection of these works upon your application. Make a selection at your leisure from the list below. Sign your name and address in the generous space provided, and send it to us. We are your obedient servants in this as in all other matters.

____2700 Variable-Area Flowmeter
____Variable Head Meter
____Turbine Meter,
____Magnetic Flowmeter
____"How To Select Flowmeters"
____"Instruments Available from Stock"

NAME: TITLE:

COMPANY:

ADDRESS:

Fischer & Porter Co., Hatboro, Pa. Dept. D

These MANUFACTURING AFFILIATES carry Fischer & Porter engineering designs to the far corners of the earth: FISCHER & PORTER LTD., WORKINGTON, CUMBERLAND, ENGLAND • FISCHER & PORTER G.m.b.H., GROSS-ELLERSHAUSEN, BEI GOTTINGEN, GERMANY • FISCHER & PORTER N. V., KONEETWEG 11, THE HAGUE, NETHERLANDS • FISCHER & PORTER Pty. LTD., 184 HANNA ST., SOUTH MELBOURNE, VICTORIA, AUSTRALIA

pleted early this year.

The company also has completed expansion of its Everett, Mass., facilities for production of chlorinated isocyanuric acids, and has constructed facilities for full-scale commercial production of chlorinated cyanuric acid salts.

Pennsalt Chemicals Corporation has completed the initial phase of a $6 million modernization program at its Wyandotte, Mich., chlorine-caustic soda facilities.

Pittsburgh Coke & Chemical Company is building a 20 million-lb-a-year maleic anhydride plant at its main Neville Island plant in Pittsburgh. It is expected the facility will go on stream in 1961.

Anderson Chemical Company, Division of Stauffer Chemical Company, has placed on stream a plant at Weston, Mich., for commercial production of vanadium oxytrichloride.

Miles Chemical Company has placed in operation at Elkhart, Ind., a $3.6 million citric acid plant which is expected to more than double present production of seven million lb annually.

Tretolite Company of California Division of Petrolite Corporation has under construction at Brea, Calif., a $2 million chemical manufacturing facility. Construction is expected to be completed before the middle of this year.

Gulf Oil Corporation has awarded a contract to Badger Manufacturing Company for engineering and construction of a multi-million-dollar isooctyl alcohol plant at Gulf's Philadelphia refinery.

Reichhold Chemicals, Inc.'s Specialty Chemicals Division has resumed production in modernized and enlarged facilities in Austin, Texas, following the plant's destruction by a tornado earlier this year. The division produces organic peroxides.

To page 18

For more information on product at left, specify 2750 . . . see information request blank opposite last page.

DAVISON

separate

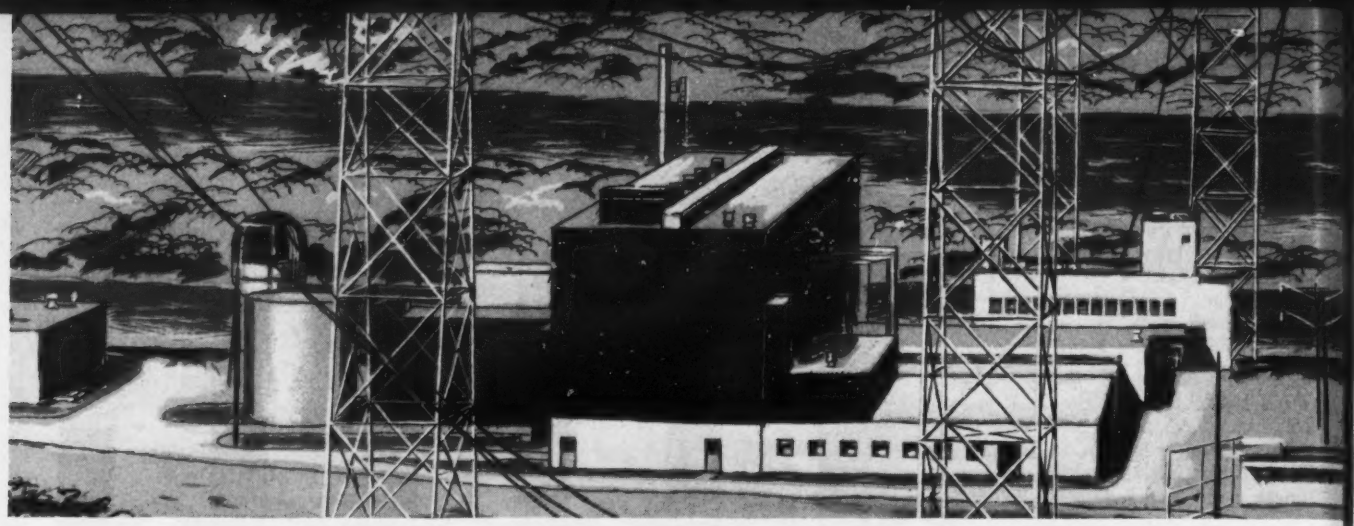
best

with Davison Silica Gel

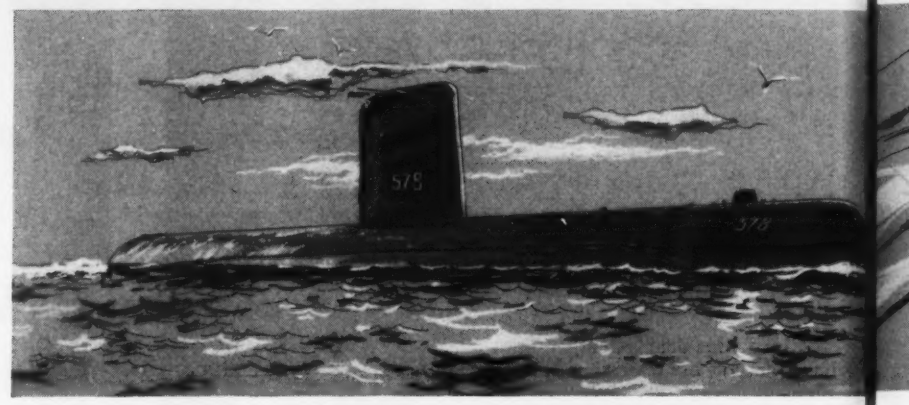
Tell us what you wish to separate. We'll supply you with a selective adsorbent of very high capacity; one that will maintain a low dew point and have excellent physical strength. It will have low pressure drop—the ability to recover hydro-carbons, if needed. The chromatographic properties of Davison Silica Gel make it ideal for the determination of aromatic compounds; the precision separation of water from gas, of 2 compounds in a single system or any of countless others. Davison Silica Gel formulated to your needs will be the finest separator you can use—give you real economy over long life. For the best, write Dept. 3711 today. We'll supply you with full information.

W.R. GRACE & CO.
DAVISON CHEMICAL DIVISION
BALTIMORE 3, MARYLAND

Check 2751 opposite last page.

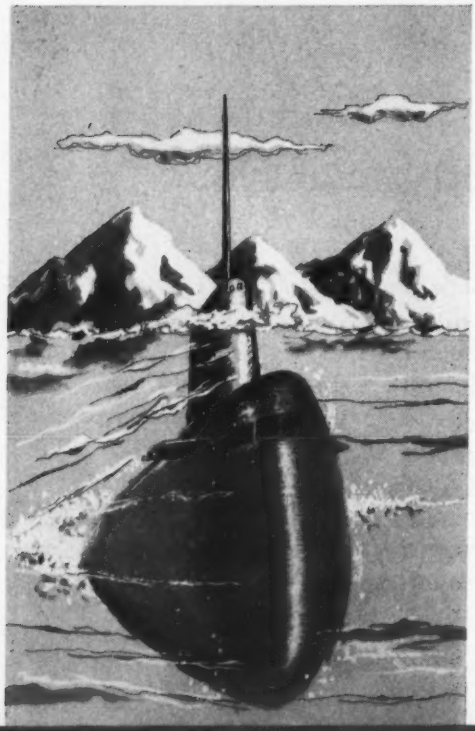


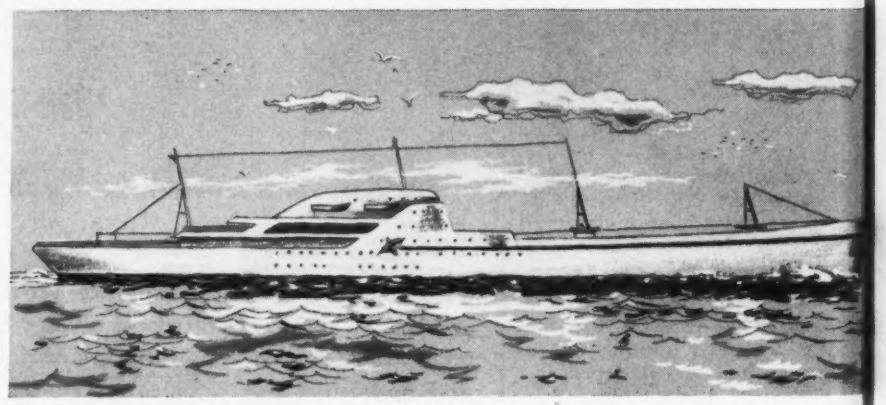
Shippingport Atomic Power Station—first United States full-scale central station atomic power plant devoted exclusively to civilian needs. First produced power on the line 12:39 A.M., December 18, 1957.



U.S.S. Skate—world's third nuclear-powered submarine. Crossed North Pole on August 11, 1958.

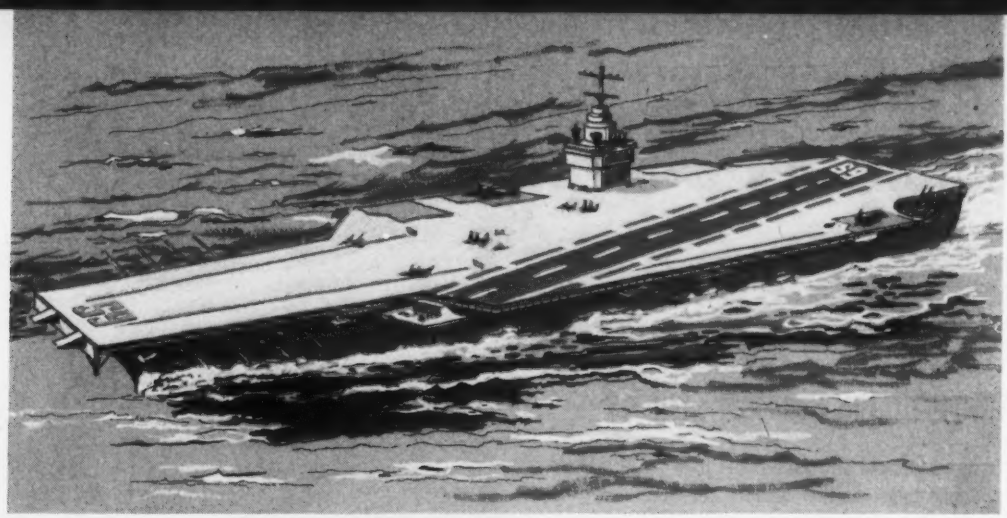
Next time you have a heating problem, remember..



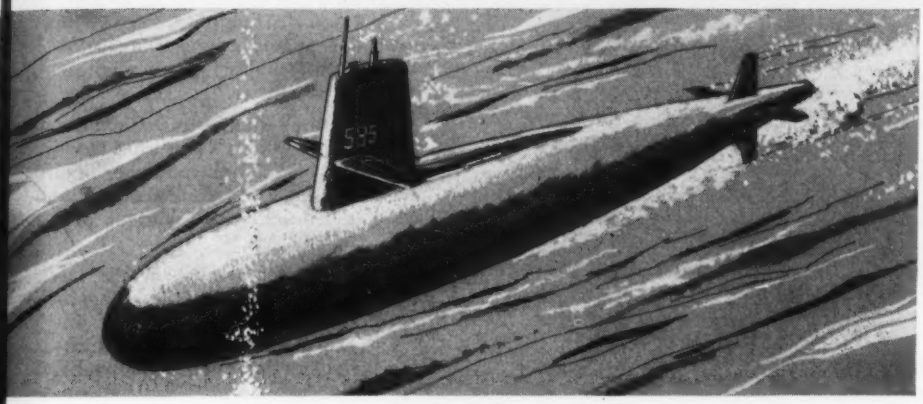


N.S. Savannah—world's first nuclear-powered merchant vessel. Launched July 21, 1959.

U.S.S. Nautilus—world's first nuclear-powered submarine. Completed first transpolar voyage August 5, 1958.



Enterprise — world's first nuclear-powered aircraft carrier. Now under construction.



U.S.S. Skipjack—world's most maneuverable submarine. Sea trials completed March 10, 1959.

CHROMALOX Electric Heat *solved* heating problems for all these projects

Heaters are installed in the primary systems of pressurized-water-type nuclear reactors to maintain the desired pressure control. *Each of the nuclear power projects illustrated uses hundreds of special Chromalox electric cartridge type heaters for this purpose.*

Chromalox electric heaters handle many other heating jobs in these projects. On the Nautilus, for example, fourteen different types of Chromalox heaters are used . . . for such applications as comfort heating, de-icing, maintaining lubricating oil temperatures, purifying air and water and cooking food.

Chromalox was first to make electric heating practical. Today, Chromalox has the world's most complete electric heating line, the largest stock and a nationwide network of Sales Engineering Representatives. Your Chromalox Man has the answers to *your* industrial, residential or commercial heating problems.

The Chromalox Library contains information on more than 15,000 different types, sizes and ratings of electric heaters and heating elements. Give us a brief outline of your problem and we will send you literature on heaters to do the job.

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are manufactured to meet and exceed the high performance requirements of critical applications. Lunkenheimer Cast Steel Valves provide longer service life and an extra margin of safety through outstanding design features, materials, and workmanship.

The cost of a Lunkenheimer Valve

gets smaller . . .

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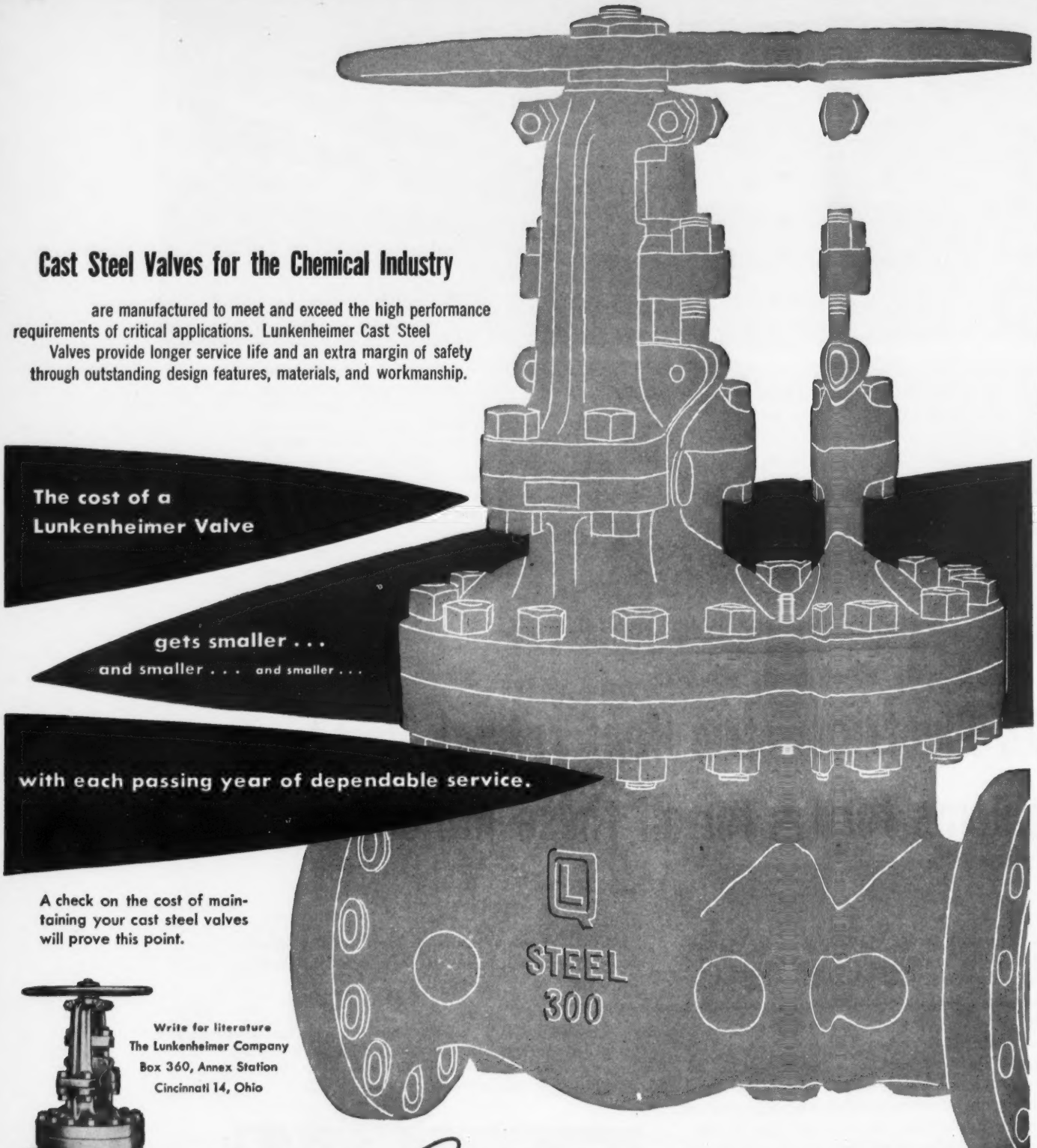
A check on the cost of maintaining your cast steel valves will prove this point.



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Check 2753 opposite last page.

CHEMICAL BUSINESS

From page 15

Alberta Oxygen & Acetylene Company, Ltd., a subsidiary of Chemetron Corporation, has placed on stream Edmonton, Alberta, a plant producing oxygen, nitrogen and acetylene.

Ethyl Corporation of Canada, Limited, has under construction at Corunna, Ontario a unit to produce ethyl chloride-ethylene dichloride.

Border Chemical Company organized recently, has awarded a contract to Chemical Construction Company to design and engineer a 50-ton contact sulfuric acid plant Winnipeg.

Olin Mathieson Chemical Corporation's Chemicals Division is planning further expansion of its electrolytic caustic-chlorine plant at McIntosh, Ala.

Victor Chemical Works has merged into Stauffer Chemical Company following approval of the action by stockholders of both companies. Victor operations will be continued as the Victor Chemical Div. of Stauffer Chemical Co. under the same management.

Foreign Plants

Montecatini and **Ansaldo** have signed a $21 million agreement with Neyveli Lignite Corporation Private, Ltd. for construction of an urea plant at Neyveli on the Indian peninsula, about 140 miles from Madras. Montecatini will design and build the plant, which will produce 300 tons of anhydrous ammonia a day. The plant is expected to be completed in late 1962, and is scheduled to be on stream in early 1963.

The Dow Chemical Company has formed a wholly owned subsidiary to make polystyrene plastic in Greece. To cost in excess of one million dollars, a plant to be erected by the subsidiary is expected to be in operation early next year.

In other Dow foreign ventures, construction is underway in Altona, Australia, of a styrene plant for C. S. I.

To page

THAT'S INTERESTING

Lots of roof

The roof of the new $540,000 Palm House at Chicago's Garfield Park Conservatory will contain 40,000 sq ft of translucent Fiberglas-reinforced plastic panels. Structure, 250 ft long and 86 ft wide, is said to be largest of its kind in the world.

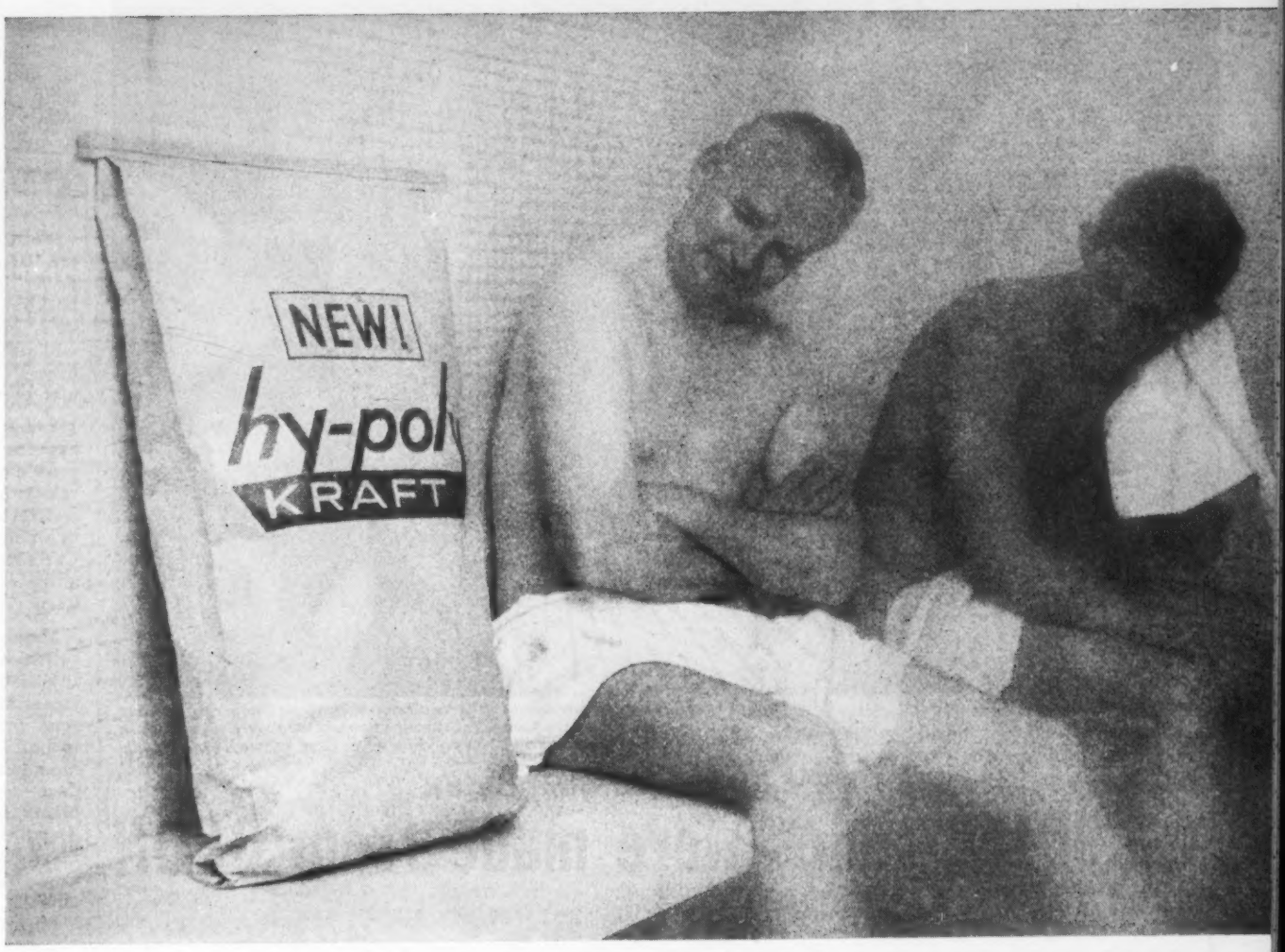
New help for trees

Addition of a fungicidal chemical to asphalt varnish used in painting tree wounds prevents growth in the paint of fungi that cause decay in shade trees, the U.S. Department of Agriculture reports. Only 0.25 percent phenyl mercury nitrate is used to give varnish antiseptic quality.

Soaring synthetics

The early part of this year will see U. S. consumption of newer man-made fibers passing the billion lb per year level. That's the forecast of A. E. Buchman Jr., general manager of Du Pont's Textile Fibers Department.

Now International Paper saves you $5 to $16 per thousand PE multiwalls!



Read why new humidity-proof "Hy-poly" kraft makes medium and low-density polyethylene sheets extravagant!

THE multiwall bag you see taking a Turkish bath in our picture contains *calcium chloride*.

We steamed this new Bagpak® multiwall in 95% relative humidity at 120° F. for 48 hours. (Unprotected, under these conditions, this chemical takes on 2½ times its weight in water in about an hour!)

But when we opened up the bag, the thirsty crystals spilled out as though they had been stored on the Sahara!

And Bagpak's new Hy-poly kraft *saves you money*. You stand to save from $5 to $16 per thousand multiwalls!

That's because new Hy-poly kraft is so superior to medium and low-density PE sheets that you get equal, if not greater, moisture-vapor protection from a coating approximately *half as thick!*

Extensive laboratory tests prove that this dramatic new barrier sheet is superior in *every way*. Write us today for samples.

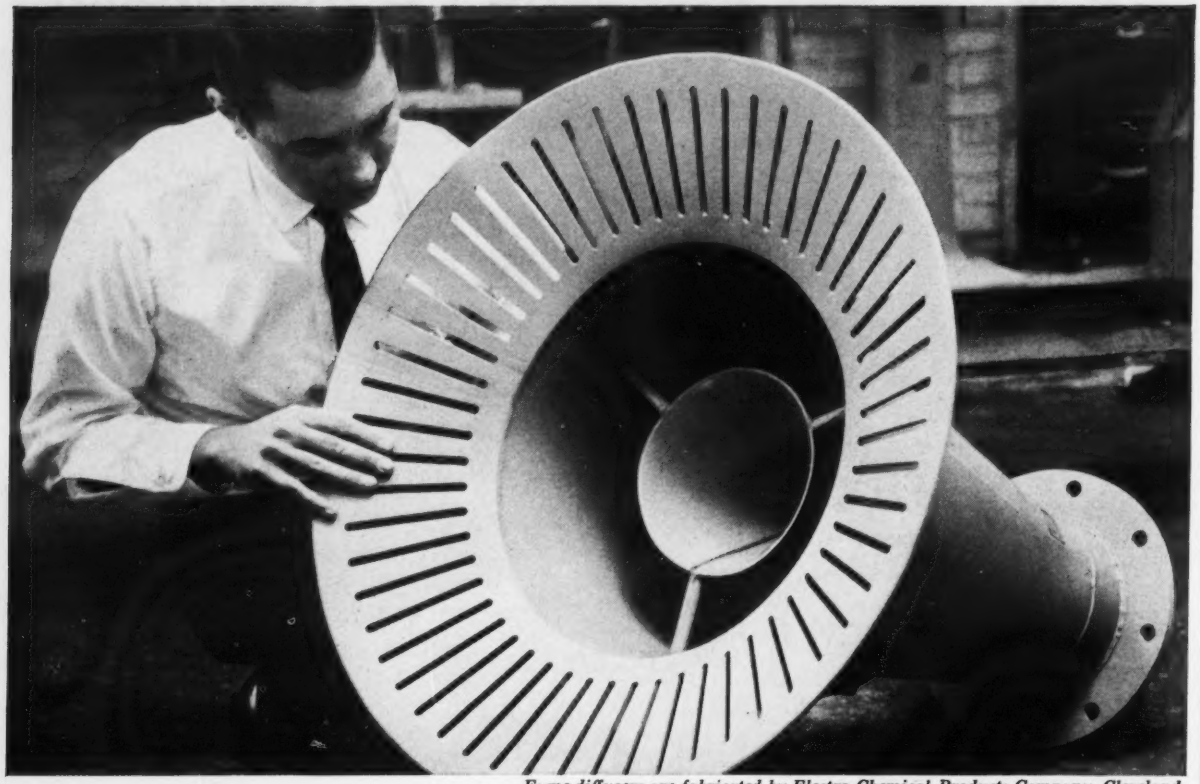
See how calcium chloride protected by Hy-poly kraft Bagpak, pours after 48-hour steam bath!

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.

Check 2754 opposite last page.

News about

B.F.Goodrich Chemical *raw materials*



Fume diffusers are fabricated by Electro-Chemical Products Company, Cleveland, Ohio, of sheets of rigid Geon made by Seiberling Rubber Company, Newcomerstown, Ohio. B.F.Goodrich Chemical Company supplies the Geon polyvinyl material only.

FUME DIFFUSERS TOOK A LICKING FROM CORROSION

. . . till the cones were made from GEON

THESE cones of Geon rigid vinyl show how you can solve corrosion problems. They are used to diffuse hydrofluoric and chromic acid fumes in a chemical plant, where cones of metal and other plastic were tried first.

Geon rigid vinyl solves corrosion problems—because it withstands acids, oils and many hydrocarbon chemicals. Geon also provides for accuracy in fabrication. For example, the sheet of rigid Geon from which these cones were made was machined to extremely close tolerance—.003 inches for the slots—to give the cones the exact design for most efficient fume dispersion.

Products of versatile Geon polyvinyl materials can be made in rigid form, rotationally cast, slush molded, calendered, extruded or blown into foam form. Applications range from solving all types of corrosion problems from piping to ductwork, to coatings for paper, metal and other materials.

For information on Geon polyvinyl raw materials, write Dept. AL-1, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

GEON polyvinyl materials • HYCAR rubber and latex
GOOD-RITE chemicals and plasticizers

Check 2755 opposite last page.

From page 18

C.-Dow Pty. Limited. Start-up is scheduled for July 1, 1961.

And in Europe, Dow's Swiss subsidiary, Dow Chemie A. G., and The Rio Tinto Company, Limited, London, have jointly acquired the share capital of Thorium Limited from Imperial Industries Limited and Howards of Ilford, former joint owners.

Petrolite Corporation's Eastern Hemisphere Division expects its new facilities at Kirkby, near Liverpool, England, to be in operation next month. A full line of oil industry chemicals will be manufactured.

Union Carbide Corporation expects to complete early next year a customer service laboratory for plastics at Geneva, Switzerland. The facility will be under supervision of Union Carbide Europa, S. A., an affiliate of Union Carbide Corporation in Geneva.

Metal and Thermit Corporation has established a new International Division to increase rate of growth of overseas' operations. M & T also is building a new facility in Monterrey, Mexico, to produce ceramic chemicals. The plant will be operated by a new subsidiary, Industrias M&T De Mexico, S. A., De C. V., owned jointly by M & T and a group of prominent Mexican industrialists.

Phillips Petroleum Company and ANIC S.p.A announce they are forming an Italian company to build and operate a plant to manufacture oil carbon black in Italy. Scheduled to be in operation within two years, the plant will have an initial design capacity of 25 million lb of oil blacks a year.

Archer-Daniels-Midland Company and **A. Boake, Roberts & Company, Ltd.**, have established a joint research program in the field of epoxidation with a view toward developing new, more versatile plastics. The project will be carried on in ADM's Minneapolis research center and in the London laboratories of the British chemical company.

PROCESS DYNAMICS

Are Unit Operations and Processes Obsolete?

JOHN MELLECKER, Editor East

PROCESS DYNAMICS AND YOU!

Such a revolutionary change in basic engineering precepts as is contemplated in the field of process dynamics has so many ramifications that it is difficult to assess them all. For that reason we would like to enlist your help. How do you think this will affect you, your job, your training, your company and the industry? Let us hear your reaction. You will be helping us give you the most comprehensive coverage possible of process dynamics and its impact.

A revolution is taking place in our chemical processing industries. Quietly, some of our most tried and (previously) true principles are being shelved or discarded. Why? To achieve plant results that in some cases will be impossible by further extrapolation of present techniques, and to cut production costs.

As processes have grown more complex, old rules of organizing a process plant as a series of sequential steps, and then tying the steps into a controllable pattern, have left more and more to be desired. Needed are more sophisticated approaches.

Leading chemical companies, petroleum refiners and others engaged in large-scale chemical processing operations are seeking these new approaches by taking long strides into scientific phenomena underlying existing and planned processes.

Radically new processes are anticipated from these efforts. Will these relate only to products not previously manufactured? Yes and no! New products will be one of the prized outgrowths of this work, but of equal importance will be improved, perhaps cheaper, ways of making established products. Alternatively, some processes might be improved by making new plants more flexible, thus permitting a shift to a chemically related product should the market for the primary product slump. Part of the new strategy, thus, is to provide one answer to the industry's over-capacity problem.

A curious fact about the "new" approach is that it strives to unfold complexities of processes which, heretofore, have been viewed from the most simple standpoints. Does this mean that the old approach through unit operations and processes is obsolete? Not completely.

The old approach has served us well, providing an adequate base to economically justify excursions into the unknown. Thus today companies can afford these studies which by their very nature are expensive.

Originating as it did during the chemical processing industries' founding and expansion period of World War I, the traditional unit operations and processes concept offered industry and educators a surprisingly valuable basis upon which the new industries' grouping and training curricula could begin to be built. This has helped both processing industries and those who supply their equipment and materials.

When "unit operations" were first proposed, they related to mechanical steps, then fairly simple, including pumping, filtration, mixing, etc. The concept of "unit processes" evolved somewhat later as a logical but more complex offshoot from "operations." In the early 20's the "operations" concept was made more fundamental by Walker, Lewis, McAdams and others who, using the physical chemists' approach, were able to develop widely applicable and powerful simplifications and correlations.

If these men could have had available today's computers, they undoubtedly would have

gone completely fundamental, avoiding establishment of correlation-approximations which were later to become a crutch of many process technologists of succeeding generations.

Ultimately, specialists in "pumps," "heat exchangers," "chlorination," "electrolysis," and other "units" developed in engineering organizations. These people have assembled, preserved and transmitted valuable practical experience together with a rapidly growing volume of data and correlations derived from experimentation.

Thus the "unit" concepts provided an almost ideal basis of operations from World Wars I through II. Certainly from 1940 to about 1955, with so much emphasis on rapid translation of best available practice into operating plants, the "units," with some exceptions, seemed to provide a happy solution.

Exceptions, however, began to increase as new levels of process ingenuity and/or complexity were attempted. In short, combining adaptations of standard operational steps was no longer providing either cofunctioning of these steps or the control required of more critical points in the process. In most cases, however, technologists ultimately remedied matters.

If, however, unbalances and control difficulties could be better anticipated and resolved without efficiency-reducing compromises, major advantages would ensue. The new approach gives promise to the hope that such can actually be accomplished.

Also, since 1946, writers of books on the "units" have tended increasingly to reduce the number of operations through functional grouping and to de-emphasize unit processes.

For example, a recent book on unit operations[1] shows five categories, functionally grouped as a) fluid flow, b) heat transmission, c) blending operations, d) separation operations, and e) solids handling.

Judging, however, from activities of process-analysis groups in major process-operating companies, today's advanced thinking and planning obviously bears little relationship to traditional "unit" concepts.

The new scheme for make-up of chemical processes is actually still so unique that there is no general agreement as to what its specific framework will be. The better one sees underlying dynamic currents in the chemical process,

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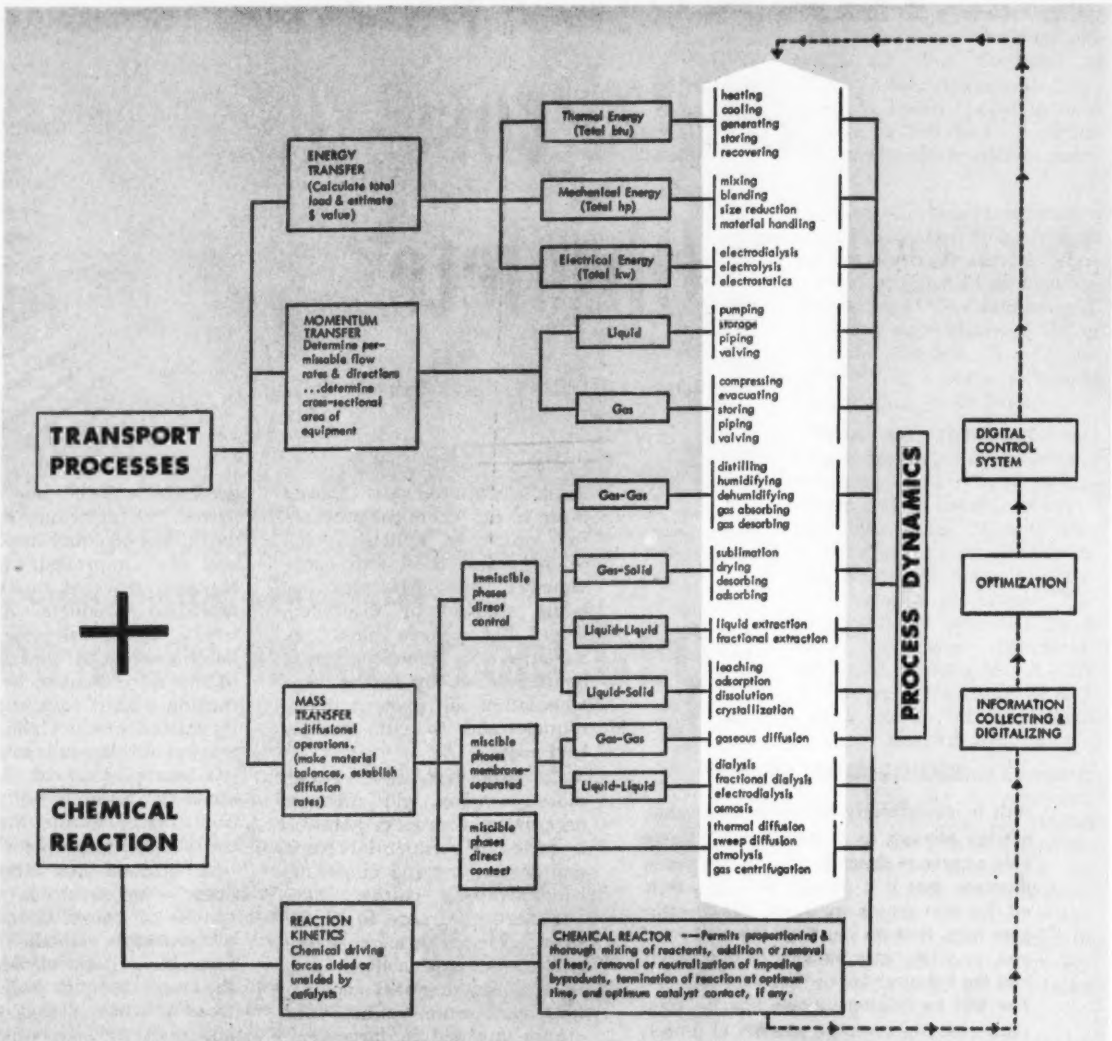

TRANSPORT PROCESSES
+
CHEMICAL REACTION
ENERGY TRANSFER (Calculate total load & estimate $ value)
MOMENTUM TRANSFER Determine permissable flow rates & directions ...determine cross-sectional area of equipment
MASS TRANSFER -diffusional operations. (make material balances, establish diffusion rates)
Thermal Energy (Total btu)
Mechanical Energy (Total hp)
Electrical Energy (Total kw)
heating cooling generating storing recovering
mixing blending size reduction material handling
electrodialysis electrolysis electrostatics
Liquid
Gas
pumping storage piping valving
compressing evacuating storing piping valving
Immiscible phases direct contact
miscible phases membrane-separated
miscible phases direct contact
Gas-Gas
Gas-Solid
Liquid-Liquid
Liquid-Solid
distilling humidifying dehumidifying gas absorbing gas desorbing
sublimation drying desorbing adsorbing
liquid extraction fractional extraction
leaching adsorption dissolution crystallization
Gas-Gas
Liquid-Liquid
gaseous diffusion
dialysis fractional dialysis electrodialysis osmosis
thermal diffusion sweep diffusion atmolysis gas centrifugation
REACTION KINETICS Chemical driving forces aided or unaided by catalysts
CHEMICAL REACTOR --Permits proportioning & thorough mixing of reactants, addition or removal of heat, removal or neutralization of impeding byproducts, termination of reaction at optimum time, and optimum catalyst contact, if any.
PROCESS DYNAMICS
DIGITAL CONTROL SYSTEM
OPTIMIZATION
INFORMATION COLLECTING & DIGITALIZING

Transport processes plus chemical reaction equals the chemical process. Time and degree of interaction between various units and items of equipment establish the performance functions known as PROCESS DYNAMICS. These functions provide the basis for scale-up plant design, and also for control system design (mass transfer relationships shown are as proposed by Treybal[2])

Literature cited:

(1) Williams, Edwin Thomas, and Johnson, R. Curtis, Stoichiometry for Chemical Engineers, McGraw-Hill Book Publishing Company, New York, 1958.

(2) Treybal, Robert E., Mass Transfer Operations, McGraw-Hill Book Publishing Company, New York, 1955.

As 86th Congress Reconvenes

CPI Will Have Important Stake in Color Additive, Tax Revision, Tariff and Antitrust Legislation

JOAN MARZIOTTI
CP Washington Correspondent

As the 1960 legislative year opens, chemical processors can look for action in several areas directly affecting their industry.

Here are the major issues to watch during what promises to be an active, election-conscious session.

Count on strong pressure from industry and government to get long-awaited color additives legislation on the books. After months of preparation and compromise, an Administration bill was sent to Congress in the first session.

The bill would permit the Food & Drug Administration to set safe tolerances for colors as they now do for other food additives.

In the Senate, the color bill (S. 2197) passed after being reported out of the Labor and Public Welfare Committee without hearings. Missing from the Senate version, however, is the controversial "Delaney Amendment."

This amendment, included in the FDA draft bill — and also in the Food Additives Amendment of 1958 — would ban absolutely any carcinogenic agents.

The House bill, on which hearings are expected to be held this session, was introduced with the "anti-cancer" amendment intact. It is generally conceded a bill without this amendment would not have a chance in the House, where Rep. James J. Delaney (D., N. Y.) will spearhead a drive to have it included.

Despite the fact many legislators feel addition of such an amendment is unnecessary and protection is assured under other provisions of the bill, it looks as if House and Senate conferees will have to agree to legislation with the amendment.

Many Difficulties Arise

Both industry and FDA already are being plagued with difficulties arising out of strict interpretation of the Delaney Amendment. Problems inherent in an "absolutely harmless" concept one day may have to be resolved in the courts, as has happened in the case of colors.

Under current interpretation of the FD&C Act, colors must be completely "harmless" even though the actual level and manner of use may be completely safe.

Events of the past year, based on this interpretation, point up the necessity for general tolerance-setting color legislation now pending before Congress.

For example, the color *Red 32* was banned on oranges, forcing passage of temporary legislation to allow for a substitute color. In other action, a series of lipstick colors were de-listed as not safe.

Unless the safe-for-use principle is incorporated into a law, it will become increasingly difficult — and eventually even impossible — to find permissible colors to supply the demand for important color uses on the part of consumers as well as the food, drug and cosmetic industries.

Chances are good for passage of an industry-approved bill to regulate labeling of potentially hazardous household products.

Seek Repeal of Old Act

Senate hearings were held late last session on a "Federal Hazardous Substances Labeling Act" (S. 1283) to repeal the outmoded Federal Caustic Poison Act of 1927.

In the works for more than five years, the revised version now is substantially satisfactory to industry and government.

Since the bill specifically exempts food, drugs and cosmetics from its requirements, FDA, in consultation with industry, got corresponding amendments to the FD&C Act inserted as a separate Title II.

Labeling provisions require appropriate "signal words," such as "danger," "warning" or "caution." "Danger" would be used on all products which are extremely flammable, corrosive or highly toxic (these terms are defined in the bill).

"Warning" or "caution" would be used on all other hazardous substances. Purpose of the signal word is to call attention to the presence of precautionary information.

Uniform precautionary labeling is designed to protect the consumer and inform the physician who might be called to treat illnesses or injuries resulting from misuse of a household product.

And if Congress passes acceptable legislation, states would then have a model to follow in creating their own legislation. Under such a federal law, manufacturers could adopt a single label which would be acceptable in the 50 states and territories.

Sources close to the Senate committee told CHEMICAL PROCESSING interested groups had so resolved their differences that it was quite likely the bill would pass this session.

While no one is talking yet about specific legislation on drug pricing, key legislators

To page 80

THE GOLDEN 60's

Leaders look ahead to the next decade and see . . .

More Productive
Research

Dynamic Growth in
Technology

Bright Outlook for
Financing

Increasing Problems in
Sales and Marketing

Swelling
Economy

Growing
Foreign Expansion

Continued Boom for
Chemicals

Technological aspects to get more attention from R & D in the 60's

DR. AUGUSTUS B. KINZEL, Vice President-Research, Union Carbide Corporation — The 1960's surely will see another great expansion of the chemical industry. Research, which may truly be considered the lifeblood of the chemical industry, will play a vital part in this expansion.

Just as many of today's products and processes are the result of years of study, experimentation and testing by our technical people, so the new products and processes of the next decade will be the outgrowth of research and development now going on in our laboratories.

Research and development, in addition to discovering and evolving new chemical reactions which will result in new products and processes, will devote increasing thought to the technological aspects of the industry. As a result, we should experience a number of important changes in chemical processing itself. These will include new unit processes such as gas chromatography and continuous solvent extraction.

One of the subjects that will receive much attention in the laboratory is better control of all of our unit processes. This will be reflected in new types of equipment such as better mixers for both gaseous and liquid materials and better metering.

The laboratory work done in this area should also result in an expanded use of tagged atoms and provide continuous information feedback process control. The subject of instrumentation and its allied problem, automation, also will be explored more fully.

This will result in greater automation in plants coupled with a major increase in instrumentation. The latter will be economically mandatory by virtue of new instruments far more reliable and sensitive than any now available.

All of this will lead to greater plant throughput and greater operating efficiency but perhaps ever more importantly it will insure an ever more reliable uniformity of product made to ever closer specifications.

This will make life easier for the fabricator, give the public a better final product and thus give still one more push to the upward cycle of use of chemical products.

More productive era due in CPI research

DR. R. H. BOUNDY, Vice President and Director of Research, The Dow Chemical Company — The chemical industry, still young and vigorous, will continue its rapid growth during the next decade.

The year 1960 finds the industry throughout the world recovered from the dislocations of war. Every industrialized nation has increased the emphasis on chemical research and technology. Those countries just starting to industrialize have initiated chemical operations.

Competitive capital invested within the United States has for the moment outrun the capacity of the domestic market to consume. Therefore, our industry will be looking for markets elsewhere — through export or foreign manufacturing. Simultaneously, foreign chemical companies are invading our markets with products where they feel they have a patent or cost advantage.

Thus, we are entering an era of world-wide competitive chemistry among many strong technological organizations. This should produce many new products, services and innovations in business methods.

Research will make itself more productive through better methods, better equipment and more careful selection of work. Research will more often recommend the purchase of existing know-how or patents rather than duplicating effort since the high cost of research and the competitive squeeze on profits will no longer permit the luxury of research organizations large enough to duplicate the work of others.

Technology, in the form of engineering, know-how and patents may well become an important factor in world commerce during the next 10 years.

If we can maintain a spirit of healthy competition among chemical organizations throughout the world, the chemical industry will be a big factor in bringing higher standards of living to more of the people of the world and at the same time be a powerful ally to world peace.

Meanwhile, our research organizations will find little rest but much excitement and much satisfaction.

Technology

CPI's technology faces 10-year era of dynamic growth

W. R. MOFFITT, Vice President and Technical Director, The Borden Chemical Company—Dynamic technological growth will mark the chemical processing industry's progress during the next decade.

Three prime factors make this a certainty:

1) Chemical products, particularly synthetic polymers, will continue to upgrade performance of natural products at an increasing rate.

2) CPI-wide research and development investment is destined to produce an ever-growing bumper crop of new materials.

3) The established trend toward absorption of labor costs by the home handyman. The result: increased demand on chemical manufacturers to adapt existing products to the home handyman's needs. This trend is expected to hit new heights in the 60's.

Synthetic polymers, for instance, are playing an important part in the upgrading of natural products in the forest products industry. Future improvements in polymers now in the advanced development stage will serve to broaden further the forest product market potential in the immediate years ahead.

Continued heavy emphasis in CPI research and development is bringing forth an abundant supply of new "wonder" products which will open up entirely new fields of application. Borden Chemical's R & D dollar is particularly concentrated in the development of thermoplastic and thermosetting polymers with completely new and revolutionary applications.

Growth Potential

The PVC series is an important example of CPI research and development effort. Although this series includes many established products, PVC end uses are growing daily. Current applications include rigid plastics for home decoration and construction and, among many others, automotive components. We feel real future growth potential lies in the functional paper coating area, for wrapping and packaging use.

The third factor which makes us feel bullish about CPI's technological future is the fact that consumers are continuing to demand products which can help them upgrade their standard of living, within the economic framework of our times.

Despite the fact it costs from three to five times as much money to paint a house today as it did 20 years ago, home owners have not stopped painting their houses.

Instead, new techniques and newly formulated paints have been developed to enable the consumer to absorb the cost of labor himself. An important example of CPI effort in this particular field is the creation of new, much improved synthetic emulsion polymer paints, which are fast-drying, offer self-leveling characteristics, and are easily applied.

We feel these three major factors, with many others, will continue to pave the way to broad CPI technological growth in 1960 and the immediate years ahead. Most important, the industry can gear its growth to the needs of our growing population.

Catalytic techniques to get more attention from CPI research

WILLIAM ENGS, Vice President Production, Stauffer Chemical Company—The chemical industry is in a unique position. As is well recognized, it contributes substantially to the progress of nearly all industry.

But, in another sense, it also benefits from industrial progress. In other words, quite often the advances which chemistry effects in other branches of industry ultimately will help the chemical industry itself.

In the past decade, for instance, chemical technology has contributed substantially to commercialization of atomic energy. New separation techniques have been perfected through chemical means, new methods of automatic and remote control have been accomplished, and new compositions have been created which are resistant to radiation and corrosion.

So it is that many of these chemical advances, first brought to stature by the pressing needs of the atomic energy program, have found application in the production of chemicals. Correspondingly, the chemical industry has been called upon to devise methods to produce novel materials, such as ultra-pure silicon and germanium, for the electronics industry.

Now the fruits of that work are bestowing benefits on the chemical industry in terms of broader knowledge of the characteristics of pure metals and their utilization in some important syntheses.

Space Technology

One of the most rapidly progressing fields of research at present is space technology. And, in my judgment, many of our industry's more significant technological advances during the next decade will stem from progress in development of rockets, missiles and space vehicles.

The evidence already is apparent. Space vehicles require unique alloys—alloys which are resistant to tremendous temperatures and which can also thwart oxidation.

It is logical to assume that many of these alloys will eventually find applications in the chemical industry.

Correspondingly, space vehicles demand the design of pressure vessels, development of radiation resistant alloys, and a more precise understanding of the kinetics of reactions. We can, with certainty, predict that such developments will have a profound influence on the technological progress which will be realized by the chemical industry.

Other circumstances, too, will thrust progress upon us. Labor costs are rising, and will continue to rise. It is obvious, then, that much more attention will be paid perforce to automatic, or electronic controls.

We can also expect that research will be focused on new catalytic techniques for, with labor and capital investment costs both rising, any gain in productivity which can be realized from more efficient catalytic techniques will be of consequence. Too, with capital costs rising, there will be a natural inclination to use computer-simulated reactions in plant design.

Financing

Outlook optimistic for CPI to obtain risk capital in 60's

RICHARD B. SCHNEIDER, Vice President, Empire Trust Company, New York—So far as we can see, CPI will not face serious problems in obtaining financing in 1960 and the 60's. We continue to feel CPI will maintain its above-average rate of growth.

High money rates, as a function of financing, may in some cases delay or even stretch out plant expansion and new product development; but, in general, the industry should have no trouble in finding funds. Internal cash flow, for a majority of companies, is at an all-time high and will carry over into the early 60's.

Quite a few companies have recently come into the equity market. This trend will probably also continue into the 60's and, together with the heavy flow of cash, contribute to an eventual easing of money rates.

The potential productivity of stepped-up research expenditures (both in government and in private industry) and of new product development in the late 50's should show results in the 60's, thus stimulating the need for all types of additional funds.

Risk Capital Available

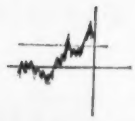
Risk capital will always be available for well-conceived projects assuming, of course, that capable and energetic management is an integral part of such projects.

The government's creation of the Small Business Investment Company Act and the subsequent formation of numerous SBI companies located throughout the United States should provide small and moderate-sized companies with additional sources of sophisticated risk capital.

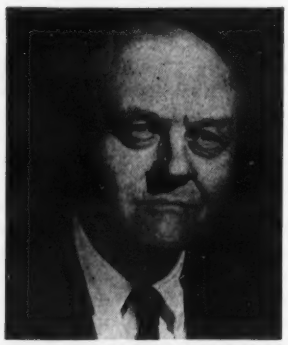
Obviously, the growth characteristics of the chemical processing industries will attract venture money of this type, and a significant portion of the funds of SBI companies may be expected to stimulate the development of chemical projects.

Therefore, we believe the outlook is optimistic, and we would not anticipate any major problems in obtaining financing into the 60's.

As specialists in CPI problems, we look forward to the future growth and development of the industry.



Sales and Marketing



Distribution problem to grow in severity during next decade

CARLTON BATES, Executive Vice President, Allied Chemical Corporation—An outstanding characteristic of the chemical industry is the frequent and rapid change in character of products. New and improved chemicals are constantly being developed which often displace those which have been in demand for some years. This is the way it should be—this is progress.

Those responsible for marketing must always be alert to customers' desires for continued improvement—more satisfactory and generally less expensive products. This will undoubtedly be more accentuated in 1960 and the years to follow. It will definitely, in the majority of cases, be a buyer's market unless current world conditions are upset. Top quality and service will be demanded.

Competition will unquestionably become more acute. There will be a tendency toward price concessions—"special deals" as they are commonly called—by those who do feel they must sell at any cost.

There are a few salesmen who, unfortunately, are only interested in the volume of sales they make—not whether the price at which they are offering their products is fair and brings a reasonable profit to their company. Well established companies usually will not tolerate this, nor will they be enticed into meeting such temporary competition for the mere exchange of dollars.

Distribution Problem

The problem of distribution, which goes hand in hand with marketing, will become a more serious factor. Shipping to points at some distance from the place of manufacture is already a real problem, especially where possible transportation by water is not feasible.

Transportation costs are ever increasing, and less expensive means will have to be found to move products to the consumer promptly in order not to necessitate higher inventories.

It appears as though industry will be faced more and more during the next few years with competition from goods produced outside of the United States. Foreign manufacturers, for the present at least, have the advantage of much lower labor rates with resulting lower production costs for, after all, the major cost of any product is basically labor in one form or another.

U. S. producers can only successfully meet this competition by more efficient production, marketing and distribution. Although this will be a real challenge to all, there is no doubt that American ingenuity will adequately rise to the occasion and meet this competition both in U. S. and foreign markets.

Foreign Expansion

Overseas expansion won't be at expense of new U.S. growth

DR. FRED A. JOLLES, Vice President, International Division, Reichhold Chemicals, Inc. —The steadily increasing expansion of the chemical industry in the United States and in foreign countries, by and with the help of American chemical companies, is based on sound and logical foundations. A continuation, even an acceleration, of this trend in the following years can be anticipated.

The underlying reasons are three-fold: (1) increasing demand throughout the world for chemical industry products by manufacturers and consumers; (2) new technological advances within the industry; (3) economic advantages to be gained by producing as near as possible to major consuming centers.

This emphasis on overseas expansion will not be at the expense of new growth in the United States. Rather, it will be in addition to enlargement of existing domestic facilities and erection of new plants for the same basic reasons.

Increasing demands and new developments have provided the pattern for remarkable rapid growth in recent years and they warrant continuing expansion for the chemical industry here and abroad.

Growing industrialization and economic expansion of foreign countries and substantial improvement of the living standard of their populations, as marked by increased consumer spending, are part of the reason for establishing chemical production facilities in foreign countries.

This underscores the optimum method of overseas expansion, by cooperative effort with nationals of countries in which growth is to occur.

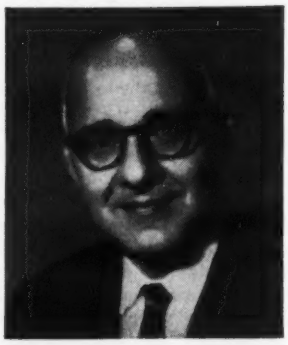
Reichhold has such cooperative arrangements in about 25 foreign countries. In each case, special emphasis has been placed on local co-ownership, local management and local labor. Local raw materials are used insofar as possible.

Not only does this policy reduce the unproductive cost of transporting raw materials and finished products to the customer but there are many other advantages. Tariffs and trade barriers are effectively bridged, and currency convertibility problems become only minor.

In addition, this partnership arrangement, confined to consulting activities, furnishing know-how and technical assistance and training foreign technicians, creates a feeling of enthusiasm among personnel of the particular organization and eliminates antipathy to dealing with "foreigners." Both factors, while intangibles, are definite assets in profitable operation of plants the world over.

Jet travel is bringing all countries closer together. We have always kept close contact with overseas affiliates by regular visits of technicians and executives, by receiving technicians and executives of affiliates for studies in our laboratories and plants, and by arranging technical and sales meetings at which people of all companies can meet and exchange experiences and ideas about their work and new developments.

We have always put emphasis on a two-way flow of people and ideas to stimulate and speed up developments and expansion in the chemical processing industry —world-wide.



Local production key to profitable foreign ventures

E. G. HESSE, Managing Director, Cyanamid International, a Division of American Cyanamid Company—In the next decade there will be a continuing emphasis on CPI foreign expansion if for no other reason than that the world chemical market is rapidly growing and international trade competition is rapidly increasing.

But if U. S. chemical manufacturers wish to share in the markets opened by programs of industrialization which are being successfully pushed forward throughout most of the Free World, they must be prepared to contribute to these programs, particularly in less-developed areas.

From 1945 to about 1950, chemical manufacturers could count on a fair share of foreign sales through export if they had a good product line and someone to take down orders. But in the 50's the situation began to change. Exports continued to mount, but not proportionately to growth of markets overseas, and at the same time—particularly in Europe—competition heightened.

As a consequence of this, many companies began to project programs of expansion based on manufacture of products within overseas market areas.

Today this concept of local production—of international rather than predominantly export trade—has become a matter of practical necessity in certain areas, particularly the European Common Market.

Originally promoted by statesmen in government, ECM is moving toward a functional reality in probably much less time than originally envisaged. This has been due largely to the vision and statesmanship of European business in not only accepting but actually promoting the concept.

What this means to the U. S. chemical manufacturer with export sales in ECM countries is clear—his market is growing as tariffs and quotas between member nations are lowered, stimulating trade and hastening further industrial development.

But his access to this market is being choked off by uniform duties on imports coming from outside the Common Market area. If he is not able to produce locally, he will have a hard time maintaining a profitable business.

However, changes also are taking place in less-developed areas, where people are moving toward their place in the sun. They need many things—probably starting with insecticides and fertilizers to raise their food supply; pharmaceuticals to wipe out diseases which take a terrible toll of national productivity; assistance in developing a chemical industry, without which no program of industrialization can succeed.

These are not merely market areas but, rather, political battlefields where our system and its appeal to men's hearts and minds will be given perhaps its severest test. If we cannot aid these peoples in raising their standard of living, we cannot expect that our system, economic or political, will prevail.

This is one of the great challenges of the 60's.

Economy

1960's to offer challenge, not assured prosperity

IRA T. ELLIS, Economist, E. I. du Pont de Nemours & Company, Inc.—America is growing. Business activity, employment, personal income, and the volume of goods and services we enjoy all reached new high levels in 1959.

Further moderate gains in these areas are expected in 1960—based principally on expected high rates of spending for automobiles, business plant and equipment, and inventories. There may be some decline in the rate of residential construction in the year ahead.

Output of the chemical industry also will increase in 1960, about eight percent above the 1959 record high average. Principal production gains in the year ahead will occur in areas which have grown fastest over the last decade: synthetic fibers, plastics materials, synthetic rubber, drugs and medicines, and basic inorganic chemicals.

The 1960's should be a decade of economic growth, particularly if we do not experience a great increase in international tension. But the "Golden 1960's" mean an opportunity or challenge rather than a period of assured prosperity.

Our population will rise about 16 percent during the decade, compared with an increase of 18.5 percent during the 1950's.

The most significant population change will occur in the age composition rather than in the growth rate alone. The number of people 18 to 24 years of age, for example, will show a rise of about two percent from 1950 to 1960, but will rise 52 percent from 1960 to 1970. We may have some difficulty in providing employment for this rapidly rising segment of our population in the late 1960's.

Purchasing power of average non-farm family income in this country will show a rise of about 21 percent during the 1950's. A similar rise is expected during the 1960's.

Industrial production may be expected to continue growing at about 3.5 percent a year, the rate of the last 50 years. The chemical industry should grow at almost twice the rate of industrial production, as it has over the last 20 years. Chemical production, in fact, will probably rise six percent to seven percent a year in the decade ahead, with growth occurring largely in newer products.

But growth in output of our economy and in the chemical industry will not be automatic or easy. It will be the result of discovering, developing, producing and selling many new products, as well as expanding the output of many "old line" products.

There will be business fluctuations during the decade, even though the trend of business activity will be upward. The first half of the decade will be more competitive than the second half because the often-cited rapid rise in the rate of family formation will occur principally in the later years of the 1960's.

Severe competition due in technology, sales, manpower

MARLIN G. GEIGER, Executive Vice President, W. R. Grace & Co.—The 1960's will put a premium on good chemical management. As never before, the level of managerial competence during the next decade should determine which chemical companies will both grow and prosper and which organizations will be passed by.

Our industry is changing. It is no longer the property of chemical companies alone. New chemical-management attitudes are appearing. One result is that competition is becoming a "characteristic" of the industry. Expenditures for research are increasing and should continue to rise, resulting, paradoxically, in greater competition for new technology.

The availability of competent manpower may also become critical as our schools fail to keep up with rising demands.

Our friends abroad are now expanding chemical production at rates which foreshadow greater competition for U. S. chemicals, not only in foreign markets, but even in our own country. A partial answer to this problem may be the establishment of foreign plants and subsidiaries.

It will take truly outstanding executives to run successful chemical firms from here on in. We will not be able to afford the run-of-the-mill company officer. The chemical executive of the 1960's will not only have to be a competent technologist, but must also have complete understanding and feeling for economic and financial trends which affect his business.

Cost of Indecision

Companies cannot afford to wallow in indecisions, as has too often been the case in the past. The costs of inadequate communications will become intolerable. The executive must therefore provide clear channels of responsibilities and sounding boards for ideas.

Research must be guided by definitive programs and controls. Above all, chemicals will need salesmanship—the old-fashioned, hard-hitting variety so often neglected by our industry.

In effect, the chemical managers of the 1960's must operate under increasingly severe conditions, not only in competition in sales, but in technology, manpower, costs and every other aspect of our business life. It will be a kind of competition our industry has never fully experienced.

Continued boom in chemicals, plastics and rubber is foreseen by George R. Vila, Group Executive Vice President, United States Rubber Company, on page 79.

Air-dry resin for finishes sets tack-free in five minutes

- **Forms a tough, glossy film without baking**
- **Cuts formulating costs by using inexpensive solvent**

Uses: Resin provides paint manufacturers and industrial finishers with a fast-air-drying vehicle. It can be used to make high-quality finishes, lacquers and aerosols for process equipment, machinery, cabinets and other metal industrial and consumer items. It is suited for automobile repainting formulations.

Features: Coatings formulated with this resin vehicle set tack-free in about five minutes and harden into a tough, glossy finish without baking. This compares with 10 minutes for a fast styrenated alkyd and 30 minutes for a pure alkyd. Because resin does not require an expensive solvent it is more economical than conventional lacquers and also has a higher solids/viscosity ratio.

Accelerated weathering tests indicate that performance of coating compares to baked melamine alkyd enamels. Finish resists a variety of common solvents including gasoline, lubricating oils and greases.

Description: Pure oxidizing-oil-modified alkyd (Aroplaz 6006-X-50) is furnished at 50% solids and can be cut back with aliphatic as well as aromatic solvents. Resin is a pure short-oil soya composition. It exhibits desirable soya alkyd features of high solids formulation, solvent resistance, color, color retention and durability.

In comparison tests, a white enamel based on this soya alkyd was evaluated with a styrenated alkyd, an acrylonitrile styrene-modified alkyd, a short-oil soya alkyd and an 80:20 medium-oil/short-oil alkyd blend. All except the last were fast-air-drying types.

Test enamel showed typical short-oil flexibility. It did not exhibit after-tack often associated with short-oil alkyds. Gasoline resistance is similar to that of medium/short-oil blend and superior to styrenated type. Water- and alkali-resistance tests indicated that enamel was similar to styrenated and acrylonitrile alkyds and considerably better than medium/short-oil blend.

Exposure in Weather-Ometer showed superior gloss retention to medium/short-oil alkyd blend and short alkyd. No evidence of checking or cracking was found after 500 hours in National Twin-Arc weathering machine.

Although essentially intended as a fast air-dry vehicle, resin can also be utilized for low-temperature-dry (140-150°F) or high-temperature-baking (300-350°F) finishes. The resulting films are hard and glossy without the use of amine resins, such as melamine or urea.

(Aroplaz 6006-X-50 alkyd resin is a product of Archer-Daniels-Midland Company, 700 Investors Bldg., Minneapolis 2, Minn.)

Check 2756 opposite last page.

WHITE ENAMEL

Test Formulation

Lb	Gal	
260.00	7.45	Rutile titanium dioxide[1]
52.10	6.33	Aroplaz 6006-X-50
5.44	0.56	24% Lead naphthenate
15.00	2.08	Butyl Cellosolve[2]
62.50	8.60	Xylol
Pebble mill grind for 16-24 hours		
600.00	73.00	Aroplaz 6006-X-50
10.40	1.45	Xylol
2.18	0.27	6% Cobalt naphthenate
1.09	0.14	6% Manganese naphthenate
1.20	0.12	ASA[3]

1 E. I. du Pont de Nemours & Co., Inc.
2 Union Carbide Chemicals Co. Div., Union Carbide Corp.
3 National Aniline Div., Allied Chemical Corp.

Specifications for Aroplaz 6006-X-50

Solids, %	50
Solvent	xylol
Viscosity @ 25°C (Gardner-Holt)	W-Y
Viscosity @ 25°C (Stokes)	10.7-17.6
Acid value, solids	6-10
Color, max (Gardner)	6
Lb/gal, solution (Average)	8.2

COMPATIBILITY WITH OTHER SYSTEMS

Resin has excellent compatibility with most other vehicle systems except cellulose acetate butyrate.

Modifier	% Compatibility*
Melamine	0-30
Urea	0-30
Nitrocellulose	0-50
Vinyl	0-50
Chlorinated rubber	0-20
Short-oil alkyd	0-90
Medium-oil alkyd	0-90
Long-oil alkyd	0-90

*Percent of modifier is based on weight of solids. Compatibility was determined by examining unpigmented dry films on glass.

Announcing

AICCO-SOL

MAGNESIUM SILICATE

New plant now producing highly adsorptive free-flowing powder

AICCO-SOL is a synthetic form of magnesium silicate with remarkable adsorptive powers, capable of de-odorizing and de-coloring liquids, and preventing caking of powders. It is a fine, white, free-flowing powder with porous structure and high surface-to-volume ratio.

AICCO-SOL is selective in its adsorptive powers, with strong affinity for acidic and polar materials, moisture vapor, gases, and color and odor-forming compounds.

Made in AICCO's new plant . . . an outgrowth of American Industrial Chemical Company's experience as a producer of silica gel, hydro gel, and other silicates. Samples and technical assistance gladly offered.

USES
- Removal of colors, odors, and impurities from solvents, oils, fats, waxes, and synthetic organic chemicals
- Curing plastics: prevention of blisters by absorbing vapor and gases released during molding
- Controlling thixotropy of plastic coatings
- Chromatographic adsorption in antibiotic and vitamin manufacture
- Retaining moisture, perfumes and flavors in powdered products.
- Preventing caking in plastic molding compounds, fertilizers, detergents, tooth powder, feed supplements, etc.
- Catalyst and catalyst carrier

PROPERTIES OF AICCO-SOL

Density, gm./cc.	2.04
Specific Area	600 sq.m./g.
Refractive Index	1.500-1.515
Pores: Volume	630 ml./g.
Avg. Dia.	33 A°
Distribution	Uniform
pH of 10% slurry	7.5-8.5

Reactions: Water adsorbed; no change in volume.
Weak acids removed by adsorption.
Strong acids dissolve it.
In salts, heavy metal ions displaced.
In bases, no reaction.

Write for data and samples

AMERICAN INDUSTRIAL CHEMICAL COMPANY
Div. of Amerace Corporation • Butler, N. J.

Check 2757 opposite last page.

Long operating cycles offered by selective palladium catalysts

Two selective hydrogenation catalysts, now offered, have long operating cycles between regenerations and are capable of operation with ratios of less than two-to-one of hydrogenation. Both are promoted palladium catalysts.

G-55 is used for selectively hydrogenating methyl acetylene and propadiene in concentrated propylene streams. Space velocities up to 1500 volumes of inlet gas per hour per volume of catalyst are achieved. Catalyst operates at temperatures as low as 130°F and pressures up to 350 psig. Because polymer formation is reduced to a minimum, operating cycles of over six months between regenerations are possible.

G-58 achieves operating cycles of from 30 to 40 weeks. It will operate at inlet temperatures as low as 75°F and pressures from 200 to 400 psig with space velocities up to 2000 volumes of dry gas per hour per volume of catalyst. It is used for selective hydrogenation of acetylene in concentrated ethylene streams.

(G-55 and G-58 are products of Girdler Catalysts, Chemical Products Division, Chemetron Corporation, Louisville, Ky.)

Check 2758 opposite last page.

Teflon, fluorocarbon resins available commercially as themoplastic film

Properties of Teflon fluorocarbon resins will soon be available commercially in form of thermoplastic film. Produced only in development quantities to date, initiation of commercial production will drop $29/lb price to $15/lb.

Process produces uniform, pinhole-free films in gages ranging from ½ mil to 40 mils and over. It is heat-sealable, heat-formable, vacuum-formable, can be metalized and in many instances can be bonded to other materials without adhesives.

Film is inert to virtually all known chemicals and solvents at temperatures up to 400°F. It has no known solvent and is affected only by alkali metals and certain complex halogenated compounds at elevated temperatures. No adverse affects have been noted in long outdoor exposure.

(Teflon FEP-fluorocarbon film is a product of Film Department, E. I. du Pont de Nemours & Company, Inc., Wilmington 98, Del.)

Check 2759 opposite last page.

Effective stabilizer for polyolefins

Uses: Increasing light and oxidation resistance of polyolefin and polyvinyl plastics.

Features: Tests indicate that from ½ to 1% of this stabilizer give greatly increased light and oxidation resistance and improved flexibility in heavy sections.

Description: White, waxy, fatty-acid modified derivative of substituted phenol, Voidox 100% has extremely low toxicity. It is acceptable for use in many foods or can be employed advantageously as a modifier of plastics which are to be used for the manufacture of food containers.

(Voidox 100% is a product of Guardian Chemical Corporation, 38-15 30th St., Long Island City 1, N. Y.)

Check 2760 opposite last page.

"Yes, I've dabbled some in chemical research. Why?"

Sodium lauryl sulfate water-white solution good emulsion base

Uses: Product can be used in emulsion polymerization, as a flotation or textile-scouring agent, or for manufacture of industrial emulsions, cosmetic suspensions and emulsions.

Features: Clear, water-white solution is particularly useful as an emulsion base where clarity and absence of color are important.

Description: Sodium lauryl sulfate is supplied as a 30% active solution. Three viscosity grades are available.

Specifications

Sodium alcohol sulfate, %	28-30
Free fatty alcohol, %	1.0 - 2.5
Sodium sulfate, % max	1.5
pH (10% solution)	7.0 - 8.5
Specific gravity	1.04-1.06

Sodium chloride content ranges from 1% for low viscosity grade to 2.5% for highest viscosity grade.

(Pendit WA sodium lauryl sulfate is a product of Chemical Division, Rayette, Inc., 261 E. Fifth, St. Paul 1, Minn.)

Check 2761 opposite last page.

Aerosol release agent for polyurethanes is long lasting

Uses: Product was developed specifically as a polyurethane release agent. It can also be used to prevent rubber mill back-roll sticking.

Features: One light application is sufficient for many molding cycles. Agent can be applied to hot or cold molds. It adheres well to metallic and non-metallic surfaces.

Description: Mold release, S-225, is a complex blend of polymeric substances. Field tests show ready mold release of polyether and polyester type urethanes and blends of urethanes with epoxy resins. Product is nonflammable and contains no toxic ingredients.

(Mold release S-225 is a product of North Shore Laboratories, PO Box 568, Salem Massachusetts.)

Check 2762 opposite last page.

SODIUM TRIPOLYPHOSPHATE
ANHYDROUS, POWDER & GRANULAR

TRISODIUM PHOSPHATE
FLAKE, CRYSTAL & ANHYDROUS

TETRASODIUM PYROPHOSPHATE
ANHYDROUS & CRYSTAL, REAGENT

SODIUM PHOSPHATE
MONOBASIC, U.S.P.

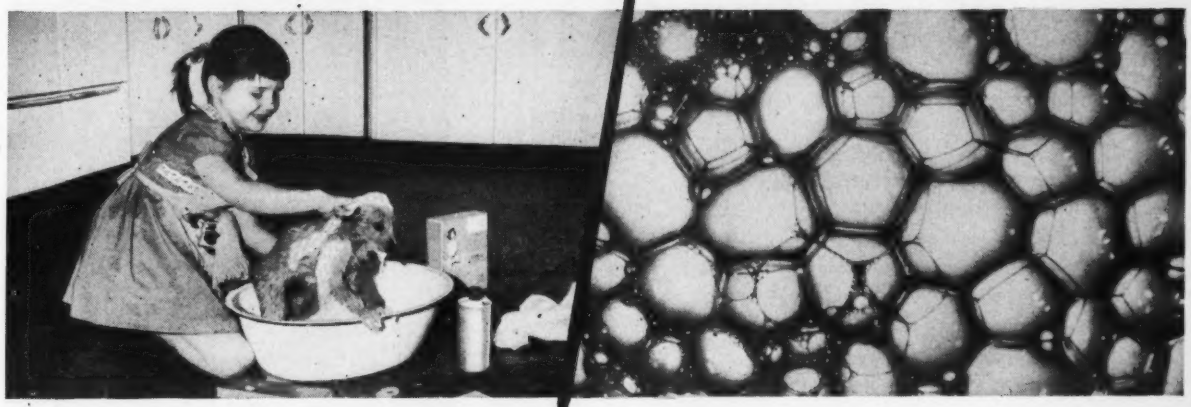
DISODIUM PHOSPHATE
ANHYDROUS

POTASSIUM PHOSPHATE
MONO & DIBASIC, PURIFIED

Also—PHOSPHORIC ACID
WET PROCESS, 65% & 75%
Com'l & Fertilizer Grades
FOOD GRADE, 75%
N.F., 85%

When it comes to

PHOSPHATES



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GENERAL CHEMICAL

Whatever your phosphate requirements—for soaps, synthetic detergents, alkaline cleaners . . . in oil well drilling . . . in textile processing . . . as deflocculating and dispersing agents . . . as water softeners . . . you can depend on General to supply phosphates as you want them, when you want them! Those listed here are available in a variety of forms, suited to every need. All offer the high quality and uniformity for which General Chemical—a primary, pioneer producer—has long been known. Stocks are carried at key distribution points, coast to coast. For your needs—write or phone today for specific information.

Basic to America's Progress

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Check 2763 opposite last page.

TOWER PACKING

HARSHAW tellerettes

All the facts about Harshaw Tellerettes are contained in a comprehensive booklet discussing their application to Tower Packing.

Subjects discussed at length (accompanied by pertinent charts)

1. The Tellerette Shape
2. Physical Characteristics
3. Lower Capital Investment and Operating Cost
4. Low Weight
5. Reduced Tower Height
6. Increased Tower Capacity
7. Support Plates
8. Corrosion Resistance
9. No Clogging

One or more copies are available at your request.

HARSHAW

THE HARSHAW CHEMICAL CO.

1945 East 97th Street, Cleveland 6, Ohio

Branches in Principal Cities

Check 2764 opposite last page.

Cationics cut caking in fertilizers and other hygroscopics

Uses: Anti-caking agents for hygroscopic salts and fertilizers.

Features: Cationic compounds condition hygroscopic materials to prevent caking by placing a hydrophobic coating on surface of the material.

Description: Compounds available for anti-caking applications range from hard, solid hydrogenated tallow amine acetates to free-flowing liquid cationic amine formulations.

Products are packed in 55-gal drums. Open-head drums are used for high-melting members of the series; OTS bung-type are used for products normally liquid at room temperature.

(Cationic conditioners are supplied by Armour Industrial Chemical Co., Div. of Armour and Company, 110 N. Wacker Dr., Chicago 6, Ill.)

Check 2765 opposite last page.

Liquid grain fumigant highly effective

Highly effective grain fumigant illustrates savings of 20-30% per bushel of protected grain. Product is composed of chloroform (71.25%), carbon bisulfide (23.75%), and ethylene dibromide (5.00%). It handles safely with no special equipment or unusual precautions and is approved by U.S. Food and Drug Administration and Department of Agriculture without restrictive recommendations or residual tolerance limits.

(Clorofume grain fumigant is a product of Frontier Chemical Company, Div. of Vulcan Materials Company, PO Box 545, Wichita 1, Kansas.)

Check 2766 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

For reduced inventories on toxicant systems — an emulsifier pair

Work well with chlorinated or phosphated compounds

Uses: Emulsifying toxicant systems, including chlorinated, brominated or phosphated insecticides, herbicides and nematocides.

Features: Formerly, emulsifier pairs have found to be useful for only a single class of compounds. It is now possible to emulsify any of the pesticide types, such as wheat killers and chlorinated and phosphated insecticides with this single pair. This permits vastly simplified inventories and formulations.

Description: Compounds, Toximul R and Toximul S, are anionic-nonionic blends. They are supplied as amber liquids with a congealing point less than 50°F. Moisture content is 0.5% and pH 5-6.

(Toximul R and S are products of Stepan Chemical Co., 427 W. Randolph St., Chicago 6, Illinois.)

Check 2767 opposite last page.

Thermally stable solvent is colorless, has wide solubility range

Uses: Product should be valuable as a polymer solvent, chemical reaction catalyst and medium, and crystallization solvent.

Features: Product is colorless and covers a wide range of solubilities for both organic and inorganic materials. It is miscible with water and most other solvents, and has good thermal and chemical stability.

Description: Dimethylacetamide, a polar solvent, is similar to dimethylformamide but with a higher boiling point. It is available in 5- and 55-gal drums. Tankcar lots can be made available on request.

(Dimethylacetamide is available from Industrial and Biochemicals Dept., E. I. du Pont de Nemours & Company, Wilmington 98, Del.)

Check 2768 opposite last page.

CHLORINATING? Then you, too, will want to see a copy of our new bulletin, *"Hooker Chlorinating Agents."* It's just off the press.

Thumb through, and you'll find a wealth of information on choosing the right chemical for a given chlorination step. In 24 pages you'll see a summary of key points on using chlorine and Hooker-made derivatives to produce organic compounds.

The new bulletin describes typical reactions with chlorine, hydrogen chloride, phosphorus chlorides, sulfur chlorides, thionyl and sulfuryl chlorides, and antimony chlorides. It saves you time with quick comparison of physical properties; it lists literature references. To get your copy, just use the coupon.

GET THIS NEW BULLETIN: *"Hooker Chlorinating Agents,"* Technical Bulletin 328-B. Free; no obligation. Fill out and mail coupon today.

Name ..... Title .....

Company .....

Address .....

City ..... Zone ..... State .....

HOOKER CHEMICAL CORPORATION
501 Forty-seventh St., Niagara Falls, N. Y.

Sales Offices: Buffalo Chicago
Los Angeles New York Niagara Falls
Philadelphia Tacoma Worcester, Mass.

HOOKER CHEMICALS PLASTICS

In Canada: Hooker Chemicals Limited, North Vancouver, B.C.

Check 2769 opposite last page.

Epoxy adhesive cuts cost and maintains strength in bonding panels

Product joins metal-to-metal or metal-to-plastics

Uses: Originally developed for bonding of rigid expanded polystyrene to metal, wood and other rigid surfaces, product is applicable for economical metal-to-metal and metal-to-plastics general-purpose bonding where strengths of the epoxy order are needed.

Features: To produce a five-mil glue line with this epoxy adhesive, would cost approximately 2.4c per sq ft of bonded surface. This compares to approximately 5.5c per sq ft of glued surface if a conventional neoprene adhesive were used at this thickness. Higher inherent strength of epoxies permits thinner glue lines which can mean substantial savings to the panel manufacturer.

Description: Material (Bondmaster M685) is available as a 100%-solids unfilled modified epoxy adhesive. Free-flowing liquid has a viscosity of approximately 3000-7000 cps and is supplied as a two-component system. Mixed weight, with hardener, is approximately 9.6 lb/gal. Pot life, depending on hardener, varies from 45 to 90 min.

Since formulation can be applied to one surface only, substantial time and labor savings can be obtained as compared with conventional solvent-disbursed adhesives.

(Bondmaster M685 epoxy adhesive is a product of Department P, Rubber & Asbestos Corp., 225 Belleville Ave., Bloomfield, N. J.)

Check 2770 opposite last page.

Vinyl quintet bows in coatings field

Available in development lots for evaluation

Five products now available for perusal of coatings formulators are based on vinyls.

Modified vinyl chloride copolymer resin, VXBC, is a

MEET TODAY'S HIGHER

powdery white solid with a specific viscosity of 0.426. It was developed for use in industrial maintenance finishes applied directly to metal.

Vinyl chloride-vinylidene chloride copolymer, NXVC, is a 40% solution that can be sprayed at high solids content. It is expected to find use in such applications as chemically resistant industrial maintenance coatings.

Physical Properties

Total solids, %	39-41
Acetone, %	2.0
Viscosity, cps (at 28°C)	10,000-13,000

Polyvinyl chloride blending resin, QXPA, has a medium particle size of approximately 60 microns. It is designed for blending with conventional small particle sized dispersion resins to produce fluid plastisols that can be formulated at low plasticizer levels.

Plastisol primer base, BKSA-2750, is a resin solution used to formulate primers for vinyl dispersion coatings. Non-volatile content is 60 ± 2%. Solvent is methyl ethyl ketone.

Vinyl-acrylic latex, WCX 140, is internally plasticized product which produces films of excellent clarity, gloss, flexibility and water-spot resistance.

(VXBC, NXVC, QXPA, BKSA-2750, and WCX 140 vinyl resins are product of Union Carbide Plastics Company, Div. of Union Carbide Corporation, 420 Lexington Ave., New York 17, N. Y.)

Check 2772 opposite last page.

R PURITY STANDARDS WITH DICALITE FILTERAIDS

DICALITE OFFERS NEW CUSTOMIZED FILTERAID SERVICE

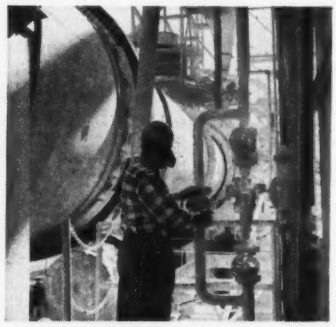
Today, standards of purity are tightening in every field—and tomorrow's will be higher still. But you can confidently meet both with the high-efficiency filteraids which Dicalite is producing right now.

Today, with new processing advances made through continuing research, Dicalite can custom-engineer a filteraid made to precisely match your individual purity problem.

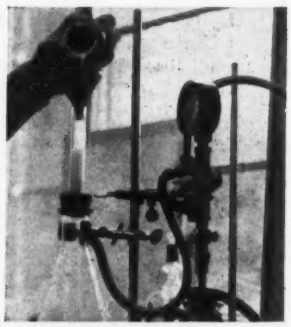
If your filtration must be so sharp that it removes particles too small to be seen with the optical microscope, a Dicalite Filteraid can do it. Or, if fast flow rates and increased production are your need, Dicalite can help you achieve that.

Your Dicalite man will be glad to advise with you on any filtration problem and help you determine if a customized filteraid will advance your processing.

Careful strata selection provides the best crude for each filteraid's final requirements.



New processing refinements, including special calcining methods, control filteraid characteristics with an accuracy never before possible in any plant.



With more than 22,000 quality control tests every month, the Dicalite plant laboratories hold every filteraid grade to rigid specifications.

New automatically-controlled packing and pressure-palletizing is the final step in efficient modern operation.

Dicalite®
Dicalite Department
Great Lakes Carbon Corporation
612 So. Flower Street, Los Angeles 17, Calif.

The product I am filtering is _____

Have Dicalite man phone for appointment ☐ Send Information ☐

NAME _____

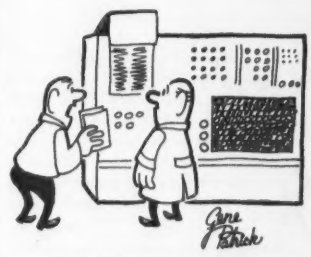
TITLE _____

COMPANY _____

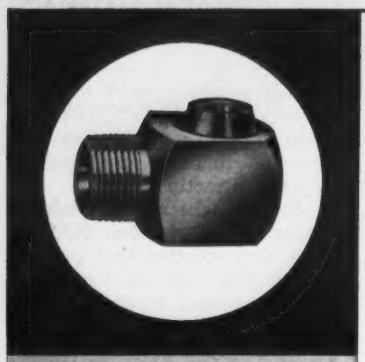
ADDRESS _____

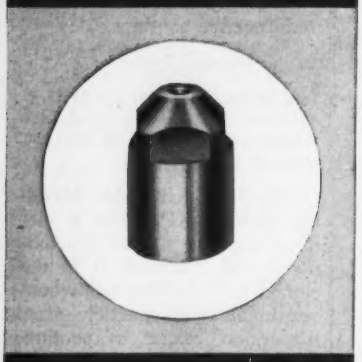
CITY _____ ZONE _____ STATE _____

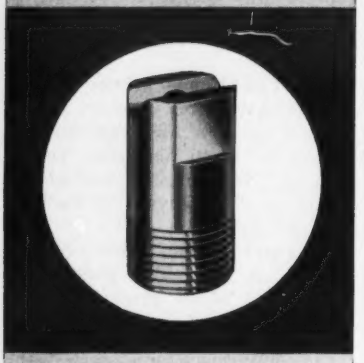
Check 2771 opposite last page.



"Be a pal and see what you can do with my kid's homework in arithmetic."







when the problem involves corrosive liquids or gases you have the choice of

STAINLESS STEEL
HARD RUBBER
USCOLITE
LEAD
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SPRAY NOZZLES

to meet every particular spraying need

Spraying Systems Co. offers a wide range of standard spray nozzles including pneumatic atomizing nozzles for desired performance and chemical stability in spraying corrosive liquids . . . or for spraying in the presence of corrosive gases or vapors. Full cone, hollow cone and flat spray nozzles are available, each in a representative choice of capacities. Experience has shown that within this range of standard spray nozzles you may well find the answer to your particular problem. For the unusual problem, we're always happy to supply the special spray nozzle characteristic or material you specify.
Your inquiry is cordially invited.

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3216 Randolph Street
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WRITE FOR CATALOG 24 — a complete 48 page reference catalog for complete technical information on thousands of standard spray nozzle types and capacities.

Continuing research is the key to Spraying Systems' product leadership . . . research in new spray nozzle designs and materials to achieve better performance . . . and research in manufacturing methods to give you ever greater product quality at lowest possible cost.

Check 2773 opposite last page.

CHEMICAL MATERIALS

Primary vinyl plasticizer has low-volatility loss on heat aging

Uses: Product serves as a primary plasticizer for both direct compounding and plastisol formulations in polyvinyl chloride, cellulose nitrate, ethylcellulose, chlorinated rubber, polystyrene and cellulose acetate butyrates of high butyryl content.

Features: Although comparable in performance with well known dioctylphthalate, this plasticizer has a lower volatility loss on heat aging and slightly more resistance to water extraction.

Description: Dioctyl isophthalate, DOIP, gives a lower viscosity than DOP in plastisol formulations with polyvinyl chloride. Physical properties of the two cured films are essentially the same.

Typical Properties	
Color, APHA	20
Acidity, % (as isophthalic)	0.003
Ester content, %	99.4
Ash	0
Boiling pt, °C (760 MM)	358

(DOIP plasicizer is a product of Eastman Chemical Products, Inc., Subs. of Eastman Kodak Co., Kingsport, Tenn.)

Check 2774 opposite last page.

Ready-to-spray enamel made by adding only pigment and water

Film characteristics compare with melamine-alkyds

Uses: Formulating industrial and automotive finishes.

Features: Only pigment and water need be added to resin to produce a ready-to-spray enamel that excludes use of solvents and dryers. Fire hazards are thus eliminated. Baked enamel films show exceptionally good flow and levelling, high gloss, and clearer and brighter colors than solvent enamels with same pigmentation.

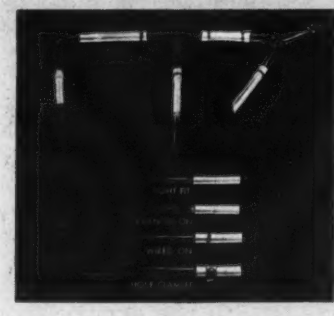
Description: Melamine-acrylic resin is a completely water-soluble, heat-convertible vehicle for formulating

Your Best Source of Supply for TUBING CONNECTORS made from

TEFLON*

is

PENNSYLVANIA FLUOROCARBON



PF TUBING CONNECTORS are available for laboratory, glassware and equipment applications in sizes to fit 3 mm through 12 mm glass tubing and in standard lengths of 1¾" with special lengths on request. They save considerable time when connections are to be made and permit misalignment of tubing without restricting flow, are reusable, easy to clean and sterilize. Inexpensive PF tubing connectors are particularly advantageous when the application involves high temperatures, strong solvents or corrosive fluids. They can be attached by wire, cement, hose clamp or tight fit.

PF Tubing connectors are stiff enough for use in vacuum systems without collapsing.

Write, wire or call for a quotation on your requirements. Other PF products made from Teflon include: instrument tubing from .010" I.D. through 1" I.D.; flexible tubing from ⅛" I.D. to 1⅛" I.D.; spaghetti tubing from AWG 0 to AWG No. 32; extruded shapes to customer requirements; rod and heavy walled tubing in standard commercial sizes.

PENNSYLVANIA FLUOROCARBON CO., INC.
1115 N. 38th Street, Phila. 4, Pa.
EVergreen 6-0603 TWX: PH 252
*DuPont registered trademark

Check 2775 opposite last page.

industrial baking enamels. It tolerates infinite dilution with water without turbidity or precipitation.

Pigments are readily dispersed by roller-mill grinding, or by grinding in pebble or steel ball mills.

Resin Characteristics

Solvent	Water
Solids, % by weight	50 ± 2
Color, Max (Gardner)	7
Viscosity	Z_4-Z_6
pH	9.5-10.0

Enamels baked 30 minutes at 300°F on bright steel have withstood 1000 hours Weather-Ometer exposure with no rusting or appreciable water spotting. Impact ratings of enamels baked on tin plate average eight inch-pounds to failure on front impact. White and colored enamels exposed two years in Florida show no evidence of blistering, checking or cracking.

(Melaqua 600 melamine-acrylic resin is a product of American Cyanamid Co., 30 Rockefeller Plaza, New York 20, New York.)

Check 2776 opposite last page.

For flame retardancy add this terphenyl to polyethylene

Uses: Material is designed to produce a flame retardant polyethylene. This is expected to be of major importance for polyethylene used to replace metal near or in contact with electrical systems.

Features: Product offers combined advantages of a low-cost flame-retarding agent plus economy of faster processing by improving melt flow of polyethylene.

Description: This 60% chlorinated terphenyl is designated Aroclor 5460. It is commercially available in five-gal containers and 500-lb fiber drums, priced at 18.25c/lb in carload quantities.

(Aroclor 5460 flame retardant for polyethylene is a product of Monsanto Chemical Co., 800 N. Lindberg Blvd., St. Louis 66, Mo.)

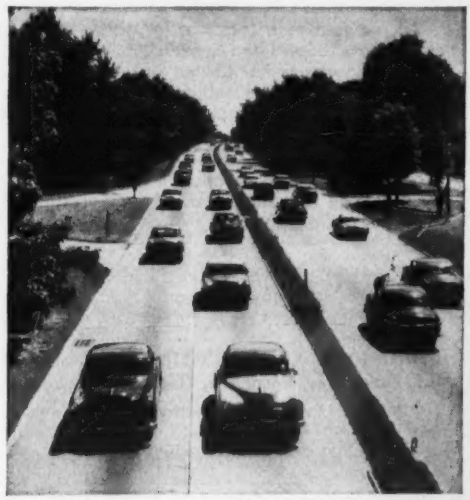
Check 2777 opposite last page.

HOW HERCULES HELPS...

Photo courtesy Asplundh Tree Expert Co., Jenkintown, Pa.

MEN OVER THE WIRE—Spiralloy®, the filamentwound glass fiber-reinforced plastic material made by Hercules, is being used for booms on truck-mounted cranes of utility companies and tree surgeons. Since it is a nonconductor of electricity, Spiralloy is particularly well-suited for this application. Lighter than aluminum and stronger than steel, it has unmatched high-strength-to-weight ratio. Spiralloy-wound cylindrical structures also are gaining acceptance in such fields as missiles, boats, pipe, and storage tanks.

INCREASE SHOE LIFE—A new Hercules material now goes into specially impregnated leather shoe soles that actually "breathe" and have many times the wearability of leather soles. Developed in cooperation with the U. S. government, this product has already proven itself in many types of footwear.



MAKE DRIVING ECONOMY—Among the many Hercules items that go into your automobile is Dalpac® 4, Hercules di-tert-butyl-p-cresol. This antioxidant is added to gasoline at the refinery to inhibit gum formation, stabilize color and help maintain engine cleanliness. It means more trouble-free miles of driving for you.

HERCULES

HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

CHEMICAL MATERIALS FOR INDUSTRY

059-7

Check 2778 opposite last page.

Now Available For Government Sale

Sealed Bid Opening February 9, 1960

LOUISVILLE BUTADIENE PLANT

LOUISVILLE, KENTUCKY

A Blue-Chip Special Purpose Facility

The Louisville Butadiene Plant, located in the "Rubbertown" area of Louisville, Kentucky is an exceptional offering for the astute investor. This special purpose plant was designed to produce butadiene from ethyl alcohol yet it is easily convertible to many other processes.

Located on a prime industrial site along the Ohio River, the facility is in marvelous condition. High volume tankage and processing equipment, low-cost transportation, complete utilities, considerable room for expansion, and a fine labor force are indications that this plant has all the requisites for high yield on the investment dollar.

All previous restrictions as to use or National Security clause have been lifted. If your company's processes are in any way similar to that of this facility, you may find that the purchase and conversion costs are minor compared to the productive capacity and advantageous location of the plant.

Is your organization ready for expansion or are you looking for a sound practical investment? In either case, the Louisville Butadiene Plant is well worth your immediate investigation.

This coupon will bring you bid form G-Kentucky-465, brochure and all information on the plant, land and equipment.

GENERAL SERVICES ADMINISTRATION, Business Service Center
U.S. Courthouse, Room 575, Chicago 4, Illinois CP

Send immediately, complete details, specifications and bid form G-Kentucky-465 on the Louisville Butadiene Plant and site offered for sale.

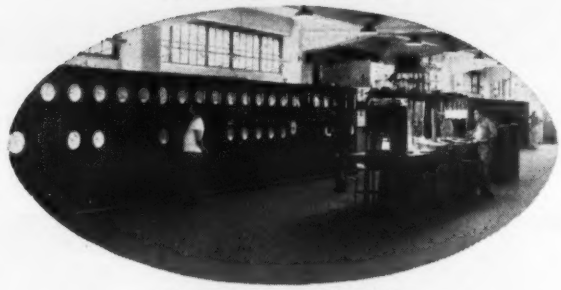
NAME_____

FIRM_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

VIEW OF ALCOHOL STORAGE AREA



CONTROL ROOM—BUTADIENE UNIT

SPECIFICATIONS

Plant Consists of:
- Approx. 139 acres
- 24 permanent buildings of brick, steel and concrete construction plus many large auxiliary structures.
- Railroad Sidings, Parking Areas.
- Room for expansion.

Tankage:
- 10 storage tanks, 12,000,000 gallon capacity at atmospheric pressure.
- Three Hortonspheres, 750,000 gal. capacity at pressures up to 75 p.s.i.
- Large barge loading facilities.

Process Equipment:
- Plant consists of three processing units. Complete equipment list submitted with coupon request.

Utilities:
- Electricity, Natural Gas, Water, Water Treating, Steam, Waste Disposal, Fire Protection, Pumping Station available on site.

Rail & Barge Service:
- Plant served by spur of Kentucky and Indiana Terminal Railroad and by 5 barge lines.

ALL AS IS, WHERE IS

Bid Deposit 5% of bid price (max. deposit $50,000). Easy credit terms. Title conveyance by quitclaim deed and bill of sale without warranty.

SEALED BIDS will be opened on February 9, 1960 at 3 P.M. (CST)

GENERAL SERVICES ADMINISTRATION
Business Service Center
U.S. COURTHOUSE, Room 575 · Chicago 4, Illinois

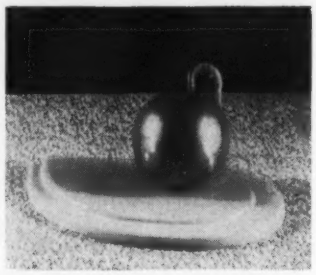
Check 2779 opposite last page.

CHEMICAL MATERIALS

Tough resin-rubber blend designed for molding

Uses: Material is specifically designed for molded products where high rigidity and resistance to cold flow under load are required.

Features: Plastic is more rigid and has less tendency to creep, or flow under load than any thermoplastic material now being marketed.



Impact resistance of product molded from resin-rubber material is demonstrated by rebound of 10-lb steel ball dropped from a height of several feet

Description: Material is a resin-rubber blend designated Kralastic MM. It is a medium-impact plastic that will withstand heat, while maintaining usable strength, up to 200°F. Moisture pickup is low. It is available in a range of colors at a price of approximately $0.50/lb.

(Kralastic MM is a product of Naugatuck Chemical Div., United States Rubber Co., Naugatuck, Conn.)

Check 2780 opposite last page.

"The boys in the flaking department resent me!"

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared by U.S. Industrial Chemicals Co.*

U.S.I. CHEMICAL NEWS

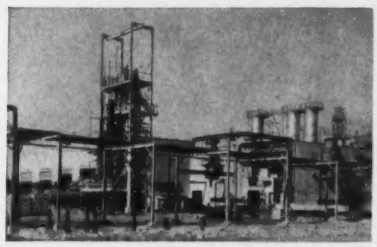
★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Polyethylene Expansion To 300 Million Pounds Planned by U.S.I.

U.S.I. has recently announced plans for a new increase in production capacity of PETROTHENE® polyethylene resins at its Houston plant—this time 50 million pounds. This will bring total company capacity to 300 million pounds per year.

The Houston plant, opened just this past March, is already being upped from 75 to 150 million pounds and, with this new expansion, will reach a capacity of 200 million pounds annually. At its other plant in Tuscola, Illinois, the company is producing polyethylene at the yearly rate of 100 million pounds.

The new expansion, expected to be complete by mid 1950, will make U.S.I., with a capacity of 300 million pounds, the second largest polyethylene producer in the world.



Gas producing area at U.S.I.'s Houston plant.

New Inorganic Polymer Has Been Made from Zinc, Chlorine and Ammonia

Researchers have recently reported the development of a new polymer containing only zinc, chlorine and ammonia—which appears to have limited elastomeric properties. The development is significant since plastics and rubber-like materials are made for the most part from organic polymers. In general, inorganic substances do not form polymers, and cannot be produced in rubbery form.

Inorganic polymers are being investigated because many inorganics resist higher temperatures than do organics, and present operating temperatures for many devices are at about the limit that organic polymers can stand. Inorganic polymers might permit raising operating temperature limits.

The new material is called a polymeric monoaminedichlorozinc, and its thermal and hydrolytic stability are said to leave much to be desired. Consequently, the research group plans to make and evaluate a large number of such compounds, in the search for the specific properties of thermal stability and elastomeric nature desired.

The new product is described as an amber-colored, transparent, glassy material at room temperature. It softens on heating and becomes a heavy syrup at about the boiling point of water. When just molten, it can be drawn into fine filaments which are reported to exhibit plasticity and flexibility after cooling. Films of the polymer are said to adhere well to aluminum and glass surfaces.

Complete Details on Sodium-Handling Equipment Presented In New U.S.I. Brochure

Third Edition of Comprehensive Sodium Handling Book Contains Much New Data, Presents Latest Information on All Phases of Handling Technology

The third edition of U.S.I.'s brochure, "Handling Metallic Sodium on a Plant Scale", edited by U.S.I.'s experienced technical service engineers, is just off the press. This brochure has been an authoritative source of information since the first edition was published in 1951, shortly after U.S.I. first opened its sodium plant at Ashtabula, Ohio.

Revised and greatly expanded, the new edition contains the latest information on metallic sodium and its uses, sodium-handling equipment, procedures for handling sodium in the plant, and general safety and first aid measures. The list of references has been brought up-to-date.

Equipment Section Is Comprehensive

The equipment section in particular has been enlarged and is now more than two times its former size. It gives much more detail on construction of pipelines for handling sodium; heating of sodium-carrying lines and valves; insulation, repair and alteration of lines; recommended gaskets, valves and vessels for handling sodium; pumping, transferring, filtering and purifying of the liquid metal; and instrumentation of liquid sodium systems.

In this section, a table has been added giving typical data on induction heating of sodium pipelines. The table on power requirements for electrical resistance heating has

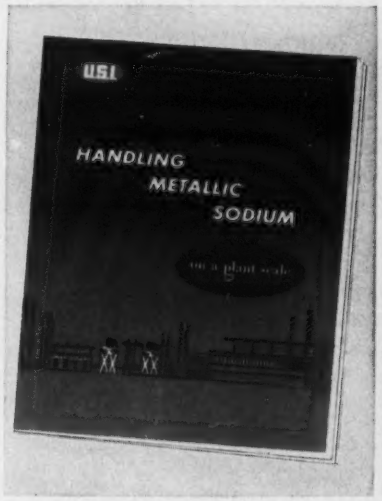
MORE

Research Elders Form Non-Profit Consulting Group

A novel kind of association has been formed under the name Technically Experienced Associates, Mobilized, or "TEAM, Inc." Members are retired research executives of some of the largest industrial companies in the country. They have formed this association to make their wide research experience available "for the benefit of mankind, without entering into competition with commercial consulting organizations or individuals."

"TEAM" members offer their services in these general research and advisory fields: research management, national defense, scientific and technical education, public health, conservation of human and natural resources, and scientific matters of national and international interest.

In keeping with the purposes and objectives of the organization, "TEAM" members offer their services at cost plus a small overhead to cover office expenses. The association says it will welcome as additional members retired research executives from broad fields of professional and scientific activity.



The cover remains the same, but the contents have been updated and greatly expanded in U.S.I.'s new edition of the brochure, "Handling Metallic Sodium on a Plant Scale."

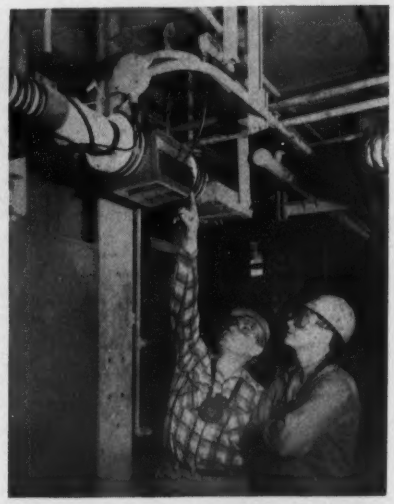


Illustration from U.S.I.'s new sodium-handling brochure shows magnetic flowmeter in sodium line at Mallory-Sharon Metals' zirconium and titanium plant, Ashtabula, Ohio.

★ U.S.I. CHEMICAL NEWS ★

CONTINUED Sodium Book

been completely revised. Also up-dated and enlarged is the table of recommended hardware for piping systems.

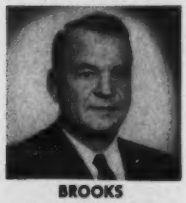
Sources and Safety Stressed

The new edition emphasizes safety measures throughout the book, as well as in a special section devoted to the subject. Throughout the book, also, can be found plentiful mention of sources for equipment, offers of technical assistance on specific problems covered in the text, and many cross-references.

The number of figures illustrating the book —and this includes diagrams and photographs —has been increased by 50%. The additions consist largely of interesting new installation photos. To aid the reader, most diagrams have been enlarged and made more legible.

Copies of the third edition of "Handling Metallic Sodium on a Plant Scale" may be obtained from U.S.I. upon request.

Three New Appointments in U.S.I. Sales Divisions



BROOKS

PARKER

LONGSTRETH

Albert C. Brooks has been named Manager of the U.S.I. Baltimore Sales Division, succeeding James F. Whitescarver who retired this September. Mr. Brooks has been with U.S.I. for over a quarter century, in plant work, sales, and most recently as Assistant Sales Division Manager in Baltimore.

Roy A. Parker has been appointed Kansas City-St. Louis Division Manager for U.S.I. Mr. Parker has been associated with the company for about 33 years and, prior to his new assignment, was Manager of the Kansas City, Mo. Sales Office.

Joseph G. Longstreth has been made Manager of U.S.I.'s St. Louis Sales Office. He has been a sales representative for the company in the St. Louis area since he joined U.S.I. in 1955.

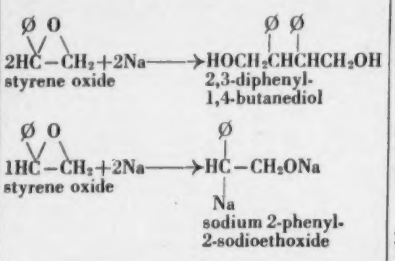
Reactions of Sodium and Compounds Discussed at Organometallic Symposium

At the Organometallic Chemistry Symposium, conducted as part of the 15th Southwest Regional Meeting of the ACS at Baton Rouge, La., on December 3, U.S.I. researchers contributed two papers on organosodium compounds.

In a paper entitled "Reactions of Disodiooctadienes," by Nobis, Robinson, Allgeier and Moormeier, it was indicated that the reaction of these compounds with oxygen or an oxygen-containing material such as an epoxide, aldehyde, ketone or chloromethyl ether, leads to a great variety of long-chain glycols. They are produced in high yield and contain eight to fourteen carbon atoms, depending on the reactant. Straight and branched chain compounds are present and easily separated.

Also covered in the paper was the ability of disodiooctadienes to metalate a variety of olefins and aromatics to yield other organosodium compounds such as allylsodium, butenylsodium, phenylsodium and benzylsodium, along with the mixed octadienes as by-products.

A paper entitled "Reactions of Sodium with Epoxides," by Mador and Robinson, revealed that such reactions result in a cleavage of the oxirane ring. The products are either 1,4-glycols (by dimerization) or a novel type of organosodium alkoxide, depending on the ratio of sodium present. For example:



These reactions are carried out with sodium dispersions in "active" ether solvent media at low temperatures. Other examples and some discussion of mechanism were presented.

Copies of either or both of these papers may be obtained from U.S.I. upon written request on company letterhead.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

New disposable polyethylene boots for technicians in biological and atomic laboratories, where spreading of contamination is a problem, are now on market. Made of lightweight film, boots give several hours of wear over shoes. **No. 1540**

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Chemical marketing problems in the 1960s are forecast in a new book which can now be purchased. The volume consists of a collection of papers presented at the national meeting of the ACS in September, 1959. **No. 1549**

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(Dithiooxamides are available from Mallinckrodt Chemical Works, 2nd and Mallinckrodt Sts., St. Louis 7, Mo.)

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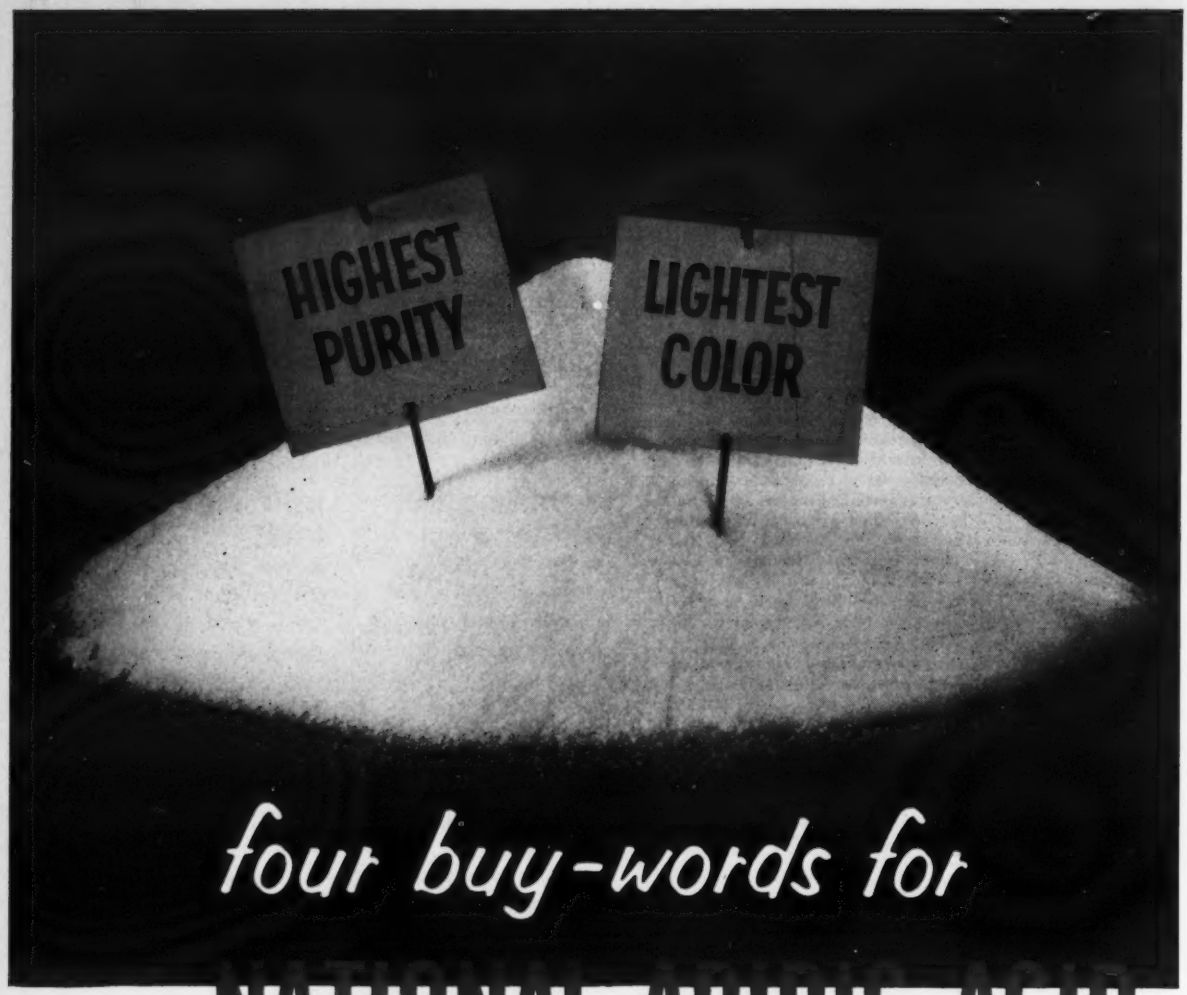

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Water-soluble resin designed for cosmetic applications

Uses: Polymer was developed for cosmetic industry to form clear gels of water or water-alcohol formulations.

Features: Thickener forms crystal-clear gels of alcohol, glycerine or water. It is compatible with most cosmetic compounding ingredients. Gels can be easily stirred or pumped during manufacturing process and can be spread or brushed out easily during use.

Description: Fluffy, white acid powder, Carbopol 940, can be used as a thickening, suspending or emulsifying agent. It is a carboxy vinyl polymer of extremely high molecular weight supplied in free acid form. Thickening occurs after polymer is neutralized. Polymer is non-toxic.

(Carbopol 940 is a product of B. F. Goodrich Chemical Company, Division of B. F. Goodrich Company, 3135 Euclid Ave., Cleveland 15, Ohio.)

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Resin's water solubility reduces fire hazard of coatings

Product is stable in storage

Uses: Product is designed for use in formulating industrial metal baking primers.

Features: Water solubility of resin reduces fire hazard in formulating. Vehicle exhibits good packaged stability with no viscosity or pH drift.

Description: Resin is a water-soluble chemically modified vegetable-oil vehicle. It is supplied at 70% nonvolatile and has a specific gravity of 1.08. No additives are needed to obtain good freeze and thaw stability.

(Kelsol 1209 water-soluble vehicle is product of Spencer Kellogg and Sons, Inc., Buffalo 5, New York.)

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THAT'S INTERESTING

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Such scars consist mostly of collagen, a fibrous protein which holds the body's tissues and joints together.

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For more information on product at right, specify 2787 see information request blank opposite last page.

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No. 86 – Improving Properties of Copper and Brass Surfaces.

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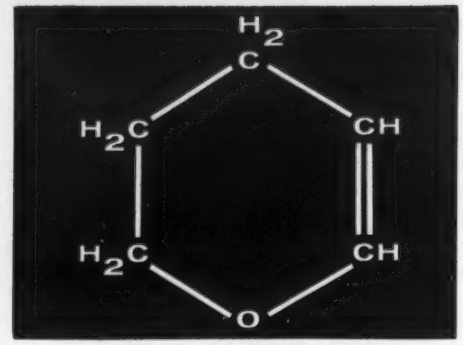

Structural formula for dihydropyran

Reactive liquid – dihydropyran makes bow as intermediate

Product is now being offered on a developmental scale in drum quantities for evaluation

Uses: A useful chemical intermediate. Reaction with water in presence of acid or an acidic ion exchange resin results in 2-hydroxytetrahydropyran, a potential intermediate for production of lysine. It is also an intermediate for reaction solvents which will direct the course of certain reactions, and for straight chain diols.

Features: Dihydropyran (2,3-dihydro-4 H-pyran) has reactivity centered around double bond. Reaction products are numerous; alcohols add readily to form acetals from which original reactants can be readily regenerated. This is a useful method of protecting alcoholic hydroxyl groups during reaction.

Compound also exhibits properties of vinyl ether, and in presence of Friedel-Crafts catalysts gives rise to polymeric products ranging from viscous syrups to hard brittle resins.

Description: Dihydropyran is a colorless, mobile liquid of ether-like odor. It is soluble in most organic solvents. Compound exhibits practically all of properties of a typical vinyl ether, adding hydrochloric and hydrobromic acids to form corresponding 2-halotetrahydropyran. Addition of chlorine or bromine forms 2,3-dichlorotetrahydropyran or the corresponding dibromo compound. Halo group in the two position (alpha to an

Physical Properties
(Pure Compound)

Molecular wt	84.11
Freezing pt, °C	−70
Boiling pt, °C	84.3
Specific gr, 20/4°C	0.927
Ref index, n25/D	1.4180
Flash pt, °F (Tag. closed cup)	0
Solubility, 25°C (g/100g water)	1.6
Azeotrope, % water (bp 71-2°C)	9.8
Lb/gal, 20°C	7.73

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ether linkage) is reactive. Three halo group is quite inert.

Alcohols readily add to double bond in presence of acid catalysts. Addition of methanol forms 2-methoxytetrahydropyran. Alcohol may be readily regenerated by hydrolysis. For example, hydroxyl group in propargyl alcohol is protected in synthesis of 4-hydroxy-but-2-ynoic acid.

Many other materials have been added to double bond of dihydropyran. Since the 2-carbon is more electropositive of carbons in double bond, it normally attracts more electronegative fragments of adding molecule. For example, reaction with chlorine in water results in formation of 2-hydroxy-3-chlorotetrahydropyran.

Reaction with acetic acid gives 2-acetoxytetrahydropyran. It also adds acetals, orthoesters and mercaptans.

Handling

Peroxide level remains low over long periods of time. However, it is recommended that dihydropyran never be distilled to dryness.

Acute toxicity data on vapor exposure, skin absorption and oral ingestion are available on request from manufacturer. Because of its low flash point (0°F) and since allowable concentration of its vapors in air has not been established, product should be kept away from heat, sparks and open flame. Adequate ventilation should be used and prolonged contact with skin and breathing of vapors avoided.

Product is available in developmental quantities: 1 gal (7 lb); 5 gal (35 lb); and 55 gal (375 lb). It is priced at $0.65/lb in drum lot. Shipping containers carry ICC Red Label for flammable liquids.

(Dihydropyran is a product of Chemicals Dept., The Quaker Oats Company, Merchandise Mart Plaza, Chicago 54, Illinois.)

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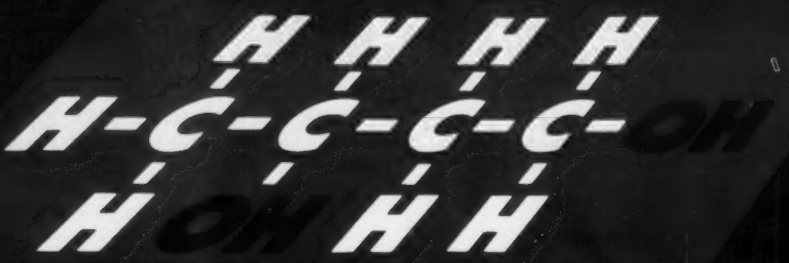

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NEW LITERATURE

Chemical Materials

Silicone rubber compounds that can be vulcanized at room temperatures are listed in 12-page bulletin which contains information on product properties and data. CDS-170A—Silicone Products Department, General Electric Co.

Check 2796 opposite last page.

Solvent for PVC resin, dimethylformamide, is discussed in bulletin which summarizes the latest laboratory data on use of the compound. Bul D4012-A—Industrial and Biochemicals Department, E. I. du Pont de Nemours & Co.

Check 2797 opposite last page.

Sucrose acetate isobutyrate's use and effect as a modifying extender in lacquers and melt coatings is covered in 16-page Bul N-105—Eastman Chemical Products, Inc. subsidiary of Eastman Kodak Company.

Check 2798 opposite last page.

Fatty acids are discussed in 32-page booklet which details preparation, characteristics and applications of 30 different varieties. "The Chemistry of Fatty Acids"—Armour Industrial Chemical Company.

Check 2799 opposite last page.

Yttrium iron garnet in single crystal form is discussed in 12-page bulletin which describes how it is grown by the flame fusion process. Bul F-815—Linde Company, Division of Union Carbide Corp.

Check 2800 opposite last page.

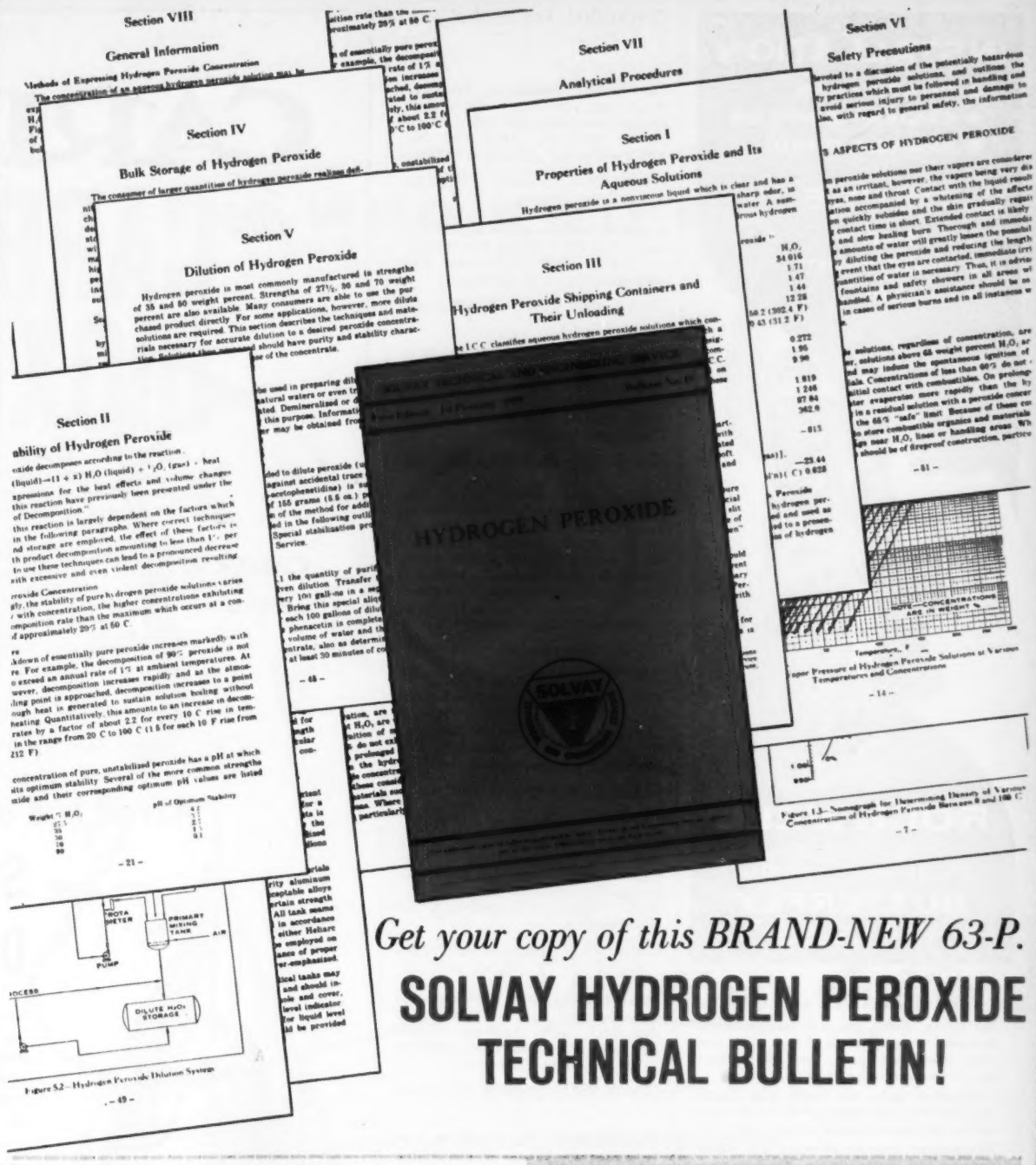
Industrial, pharmaceutical and agricultural chemicals are listed in 44-page general catalog which includes established products and developmental items. "Products of The Dow Chemical Company"—The Dow Chemical Company.

Check 2801 opposite last page.

Polyester resin which has certain end-use characteristics approaching those of epoxies is covered in two technical bulletins, one of which deals with a room temperature curing system. "Atlac 382 Bulletins"—Chemicals Division, Atlas Powder Company.

Check 2802 opposite last page.

Epoxy products — adhesives, plastic alloys, sealants and coatings—are covered in fact and guide book that includes technical data. "Resiweld Epoxy Manual"—available on business letterhead from H. B. Fuller Company, 255 Eagle St., St. Paul 2, Minn.



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Methylene Chloride • Cleaning Compounds • Hydrogen Peroxide • Aluminum
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Check 2803 opposite last page.

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- POSITIVE
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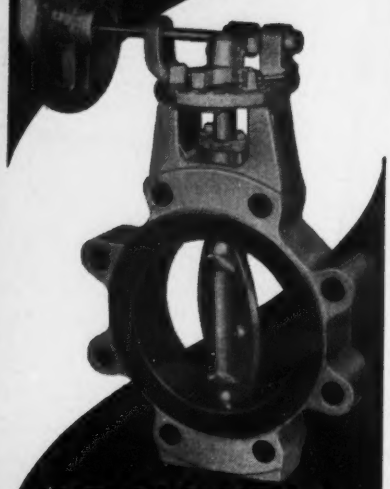

ROCKWELL
Resilient-Seated
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ENGINEERING FACTS

For control of air, gases or process fluids Rockwell Wafer Butterfly Valves give you these installation, service and maintenance advantages not found in other types:

1—Narrower body, less length and simpler construction—make valve lighter, easier to install in less space at lower overall cost.

2—Equalized pressure on valve disc makes opening and closing simple. Minimum pressure drop.

3—Rubber, Neoprene, Hycar, Viton or other resilient synthetic seat forms positive drop-tight seal on shut off and a tight gasket seal between valve and pipe flanges. The "Keelok" seat is easily removable.

4—No fouling—no clogging—valve is self-cleaning.

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Write for Bulletin 583.

W. S. ROCKWELL COMPANY
2200 Eliot St. • Fairfield, Conn.

Check 2804 opposite last page.

CHEMICAL MATERIALS

Chlorinating agents are described in 21-page brochure which summarizes methods and types of reactions obtained. Tech Bul No. 328-B—Hooker Chemical Corp.

Check 2805 opposite last page.

Synthetic surface active agents and detergents for industry are covered in 24-page Bul 7663—Soap Department, Swift & Company.

Check 2806 opposite last page.

Zinc stearate of lacquer grade is covered in booklet which describes uses and properties as well as recommended concentrations. Tech. Bul M-29—Witco Chemical Company, Inc.

Check 2807 opposite last page.

Rigid polyethylene applications and characteristics are reported in a novel 26-page brochure fitted with a special pocket which contains two general technical bulletins. "Marlex, Its Growth—Your Opportunity"—Plastic Sales Division, Phillips Chemical Co.

Check 2808 opposite last page.

Carbon monoxide physical constants, description and typical analyses are covered in two-page Bul "Carbon Monoxide"—The Matheson Company, Inc.

Check 2809 opposite last page.

Polycarbonate rods, tubing, plates and discs are described in two-page bulletin which also gives suggested applications. Bul BR-12—The Polymer Corporation of Pennsylvania.

Check 2810 opposite last page.

Polypropylene film characteristics are covered in a preliminary technical data bulletin "Some Pertinent Facts on Polypropylene Film"—AviSun Corporation.

Check 2811 opposite last page.

Emulsifiers of the emollient w/o type that are known as absorption bases are described in four-page brochure Product Bul No. 33—Robinson Wagner Company, Inc.

Check 2812 opposite last page.

Epoxy resin adhesive packs are described and their uses delineated in two-page Bul MC-171—Fenwal Incorporated.

Check 2813 opposite last page.

Platinum products, chemicals, recovery and refining facilities are listed in 20-page booklet. Cat JB57P-5M-859R—available only on business letterhead request to J. Bishop & Co., Malvern, Pa.

CARDOX®
For CARBON DIOXIDE

LIQUID, GAS, DRY ICE

65 conveniently located CO_2 Supply Depots and fleets of trucks and rail tank cars insure reliable service and supply.

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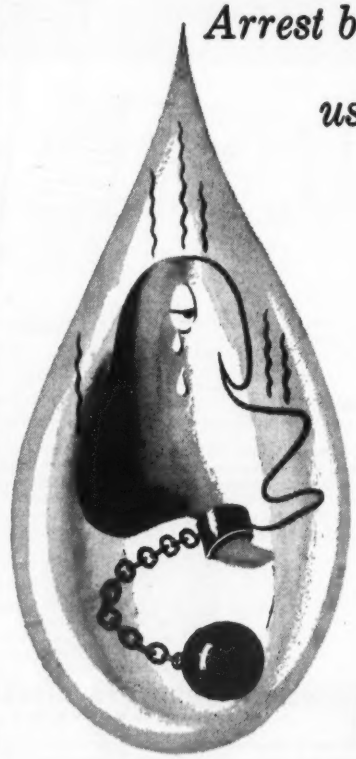
Check 2814 opposite last page.

Arrest bad odors...
use SINDAR'S DEODALL®



The elimination of unpleasant odor is an important concept of modern merchandising, whether the product is a consumer paint or varnish or an industrial material such as a cutting oil, solvent or fertilizer.

You can assure complete freedom from unpleasant odors by using Sindar's multipurpose masking agents in your product.

A description of the material and any pertinent production data will help our specialists select the right *Deodall* for your use.

SINDAR® *Corporation*
Industrial Aromatics and Chemicals
321 West 44th Street, New York 36, N. Y.

Check 2815 opposite last page.

Urea's availability in the East in prilled and crystalline form is pointed up in a four-page fact sheet Bul AD 1109-759—Chemicals Division, Olin Mathieson Chemical Corporation.

Check 2816 opposite last page.

Color compounds and dyes available for small volume users are listed in six-page Cat R—Pylam Products Company Incorporated.

Check 2817 opposite last page.

Electronic phosphors and electronic chemicals are described in illustrated General Cat 3000—Lamp Metals and Components Department, General Electric Company.

Check 2818 opposite last page.

Nylon, acetal resin or chlorinated polyether resin extrusions are outlined as to their advantages, uses and limitations in four-page brochure Bul 9263-659—National Vulcanized Fibre Co.

Check 2819 opposite last page.

Potato starch characteristics and applications in the textile industry are described in four-page Bul A-810-MP30 — Morningstar-Paisley, Inc.

Check 2820 opposite last page.

ARE YOU A CARTOONIST?

If so, you can recognize humorous incidents in chemical processing operations that can be turned into profits for you.

CHEMICAL PROCESSING will pay:

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Chicago 11, Illinois

Don't forget to include your name, address, and company affiliation.

WHO SWIPED PAGE 61

D'ja ever pick up a copy of CHEMICAL PROCESSING with an article torn out . . . or even worse, HALF an article torn out?

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POWER
3
SPEED
COMPACTNESS

Fisher-Continental Type 480 will give you all 3 on your next

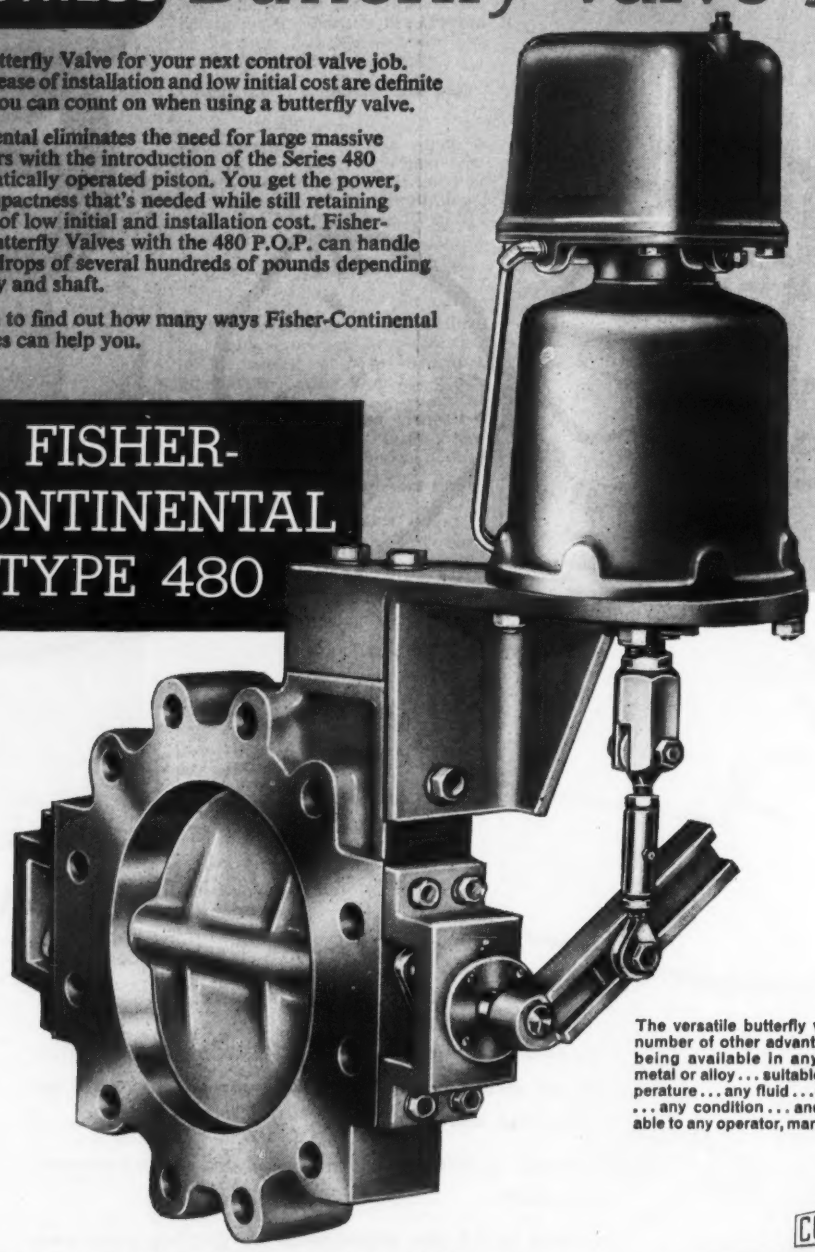
Butterfly Valve Job

Consider a Butterfly Valve for your next control valve job. Compactness, ease of installation and low initial cost are definite plus features you can count on when using a butterfly valve.

Fisher-Continental eliminates the need for large massive power actuators with the introduction of the Series 480 P.O.P. pneumatically operated piston. You get the power, speed and compactness that's needed while still retaining the advantage of low initial and installation cost. Fisher-Continental Butterfly Valves with the 480 P.O.P. can handle high pressure drops of several hundreds of pounds depending on size of body and shaft.

It will pay you to find out how many ways Fisher-Continental Butterfly Valves can help you.

FISHER-CONTINENTAL TYPE 480



The versatile butterfly valve offers a number of other advantages such as being available in any size... any metal or alloy... suitable for any temperature... any fluid... any pressure ... any condition... and it is adaptable to any operator, manual or power.

IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD... CHANCES ARE IT'S CONTROLLED BY...

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BUTTERFLY VALVE DIVISION: CONTINENTAL EQUIPMENT CO., CORAOPOLIS, PENNSYLVANIA

CONTINENTAL

FISHER® controls

SINCE 1880

Check 2821 opposite last page.

CHEMICAL MATERIALS

Glycol-ether solvents are covered in 40-page booklet which describes properties and uses of 14 of these materials. Included is a bibliography and reference section. Bul F-4765E—Union Carbide Chemicals Company, Div. of Union Carbide Corporation.

Check 2822 opposite last page.

Phenolic resin and diallyl phthalate molding compounds are described in 16-page booklet Bul D204-H-59—Durez Plastics Division, Hooker Chemical Corp.

Check 2823 opposite last page.

Natural pearl essence and synthetic pearl pigments are detailed in eight-page guide which points up their uses, qualities and characteristics. "Nacreous Pigment Handbook"—The Mearl Corp.

Check 2824 opposite last page.

Sodium pentachlorophenate's applications, specifications, physical properties and solubility data are given in four-page Tech Bul "Chlorophen 663 and 664"—Reichhold Chemicals, Inc.

Check 2825 opposite last page.

Polyethylene line wire covering is discussed in technical data bulletin which outlines benefits inherent in company's product. "Polyethylene. . . The Best Line Wire Covering" — U. S. Industrial Chemicals Company, Div. of National Distillers and Chemical Corporation.

Check 2826 opposite last page.

Acrylic thermoplastic resin suitable for injection molding and extrusion is discussed in "PL-11 Technical Information Brochure" available from Commercial Development Department, J. T. Baker Chemical Co.

Check 2827 opposite last page.

Silicone fluids' engineering properties have been assembled in a design file which includes charts. Some graphs are on sheets large enough to permit designer to work right on them. Effects of silicone fluids on elastomers also are covered. "Design File"—Silicones Division, Union Carbide Corp.

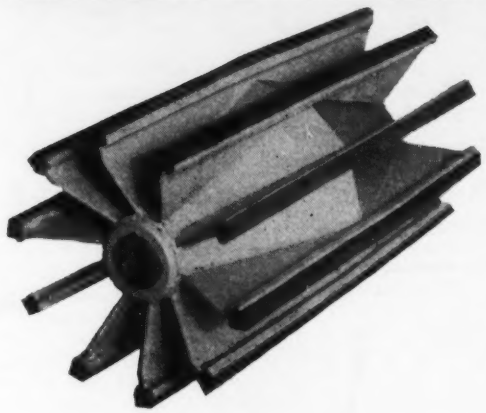
Check 2828 opposite last page.

Laboratory reagents—more than 7000 of them—are alphabetically listed in 365-page chemical index. Formulas, formula weights, melting and boiling points, color index numbers and instructions on storing chemicals are also given in Cat 123 which is available free to qualified laboratories from Fisher Scientific Company, 303 Fisher Bldg., Pittsburgh 19, Pa.

Self-cleaning flexible neoprene idlers and lagged wing-type pulleys assure . . .

Clean conveyors, longer belt life in handling sticky TSP

Workman inspects conveyor system at Cyanamid's Brewster, Fla., fertilizer plant. Note cleanliness of conveyor idlers, despite fact that triple-super-phosphate is notorious for its stickiness



Self-cleaning pulley used at the Brewster plant has extruded rubber tongue-and-groove bearing bars which prevent buildup

PROBLEM: Previous experience told American Cyanamid Company that conventional belt-conveyor idlers would not be suitable for use in its highly automated triple-super-phosphate plant, which started up in Brewster, Fla., in fall, 1957. The material sticks like glue, would accumulate on the idlers and require constant cleaning and excessive downtime.

Solution: After studying various plans and designs, Cyanamid decided to use a resilient neoprene idler that cleans itself. Called the Limberoller, this idler is molded to a wire rope freely suspended from two bearings up and out of the way of the phosphate on the belt.

Centrifugal force and flexing action of the idler cleans off the sticky material. The idler centers itself and the material it carries.

The Process

Conventional phosphate rock, stored in two silos, is air-conveyed to a 5 x 225′ conveyor belt. It is treated with phosphoric acid on this belt, producing a substance that resembles a flour that has been slightly moistened—very sticky.

Belt is made of five plies of 32-oz cotton duck. Bottom cover is ⅛″ 4000-lb-tensile rubber. Over the plies is ¼″ pure gum, covered with a breaker strip that wraps around the carcass. On top of this is ¼″ rubber with same specifications as bottom cover.

Material is cured for 30 days in a prestressed concrete building 960′ long, 100′ wide, 45′ high at one end and 41′ at the other. The almost exclusive use of concrete was necessitated by the fact that corrosive fluoride gas is given off during curing.

A 450′-long reversible shuttle conveyor runs along a track at the top of the building and distributes the material evenly. As the different sections of material on the floor complete their 30-day cure, chutes in the floor are opened and the fertilizer is shoveled through to a belt conveyor running the entire length of the building.

This conveyor carries it to the pulverizing and screening area. The belt running into the screening plant is 1100′ long.

Lagged Self-cleaning Pulley

The plant is now using a unique lagged self-cleaning pulley. It was found that the phosphate even clings to ordinary self-cleaning pulleys. The new pulley is similar to a wing type, but has rods of 35-Durometer, 4000-lb-tensile rubber inserted in the wing tips. The rubber grips the belt tightly and spalls off the dried material. Cyanamid is specifying this type of pulley for two new plants under construction.

Results: According to George Lyle, assistant chief engineer at the Brewster plant, performance of the idlers has surpassed the company's expectations. Both the idlers and the new lagged pulley have practically eliminated need for cleaning shutdowns, and they have proved to be essentially maintenance-free.

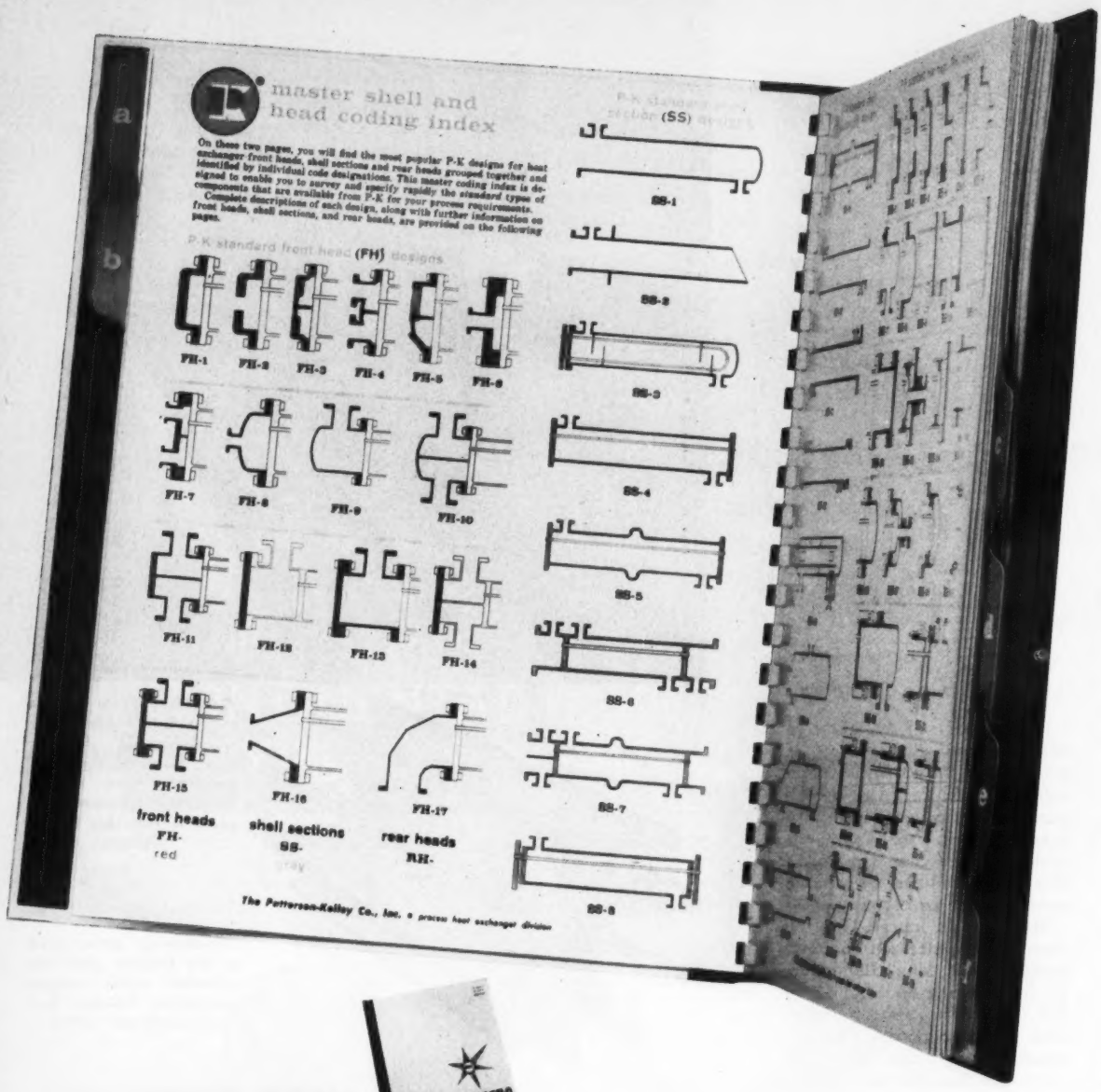
Since there is no buildup to score and wear belts, life of a belt is longer. The plant has not replaced one belt since starting up in the fall of 1957.

(Limberoller idlers are product of Joy Manufacturing Company, 307-33 Oliver Bldg., Pittsburgh 22, Pa.)

Check 2829 opposite last page.

(Lagged self-cleaning pulley is development of Florida Conveyor & Equipment Co., Mulberry, Fla.)

Check 2830 opposite last page.


master shell and head coding index
On these two pages, you will find the most popular P-K designs for heat exchanger front heads, shell sections and rear heads grouped together and identified by individual code designations. This master coding index is designed to enable you to survey and specify rapidly the standard types of components that are available from P-K for your process requirements.
Complete descriptions of each design, along with further information on front heads, shell sections, and rear heads, are provided on the following pages.
P-K standard front head (FH) designs
FH-1
FH-2
FH-3
FH-4
FH-5
FH-6
FH-7
FH-8
FH-9
FH-10
FH-11
FH-12
FH-13
FH-14
FH-15
FH-16
FH-17
front heads FH- red
shell sections SS- gray
rear heads RH-
(SS)
SS-1
SS-2
SS-3
SS-4
SS-5
SS-6
SS-7
SS-8
The Patterson-Kelley Co., Inc. a process heat exchanger division

NEW WORK BOOK SIMPLIFIES HEAT EXCHANGER SELECTION

The need for a standard terminology to simplify communications between P-K and engineers in the chemical processing industry has been met in P-K's new Heat Exchanger Manual.

This unique communications tool illustrates and describes components of shell and tube heat exchangers commonly used in processing. A complete system of interchangeable front heads, shells and rear heads is established. Fundamentals of heat transfer and design are reviewed. Even economic considerations are discussed. The simple, certain nomenclature saves time, effort and duplication of engineering work.

This 120-page manual, indexed and bound in hard covers, will be supplemented from time to time with new technical material. Names of holders will be registered to receive such material as it appears.

Only a limited number of copies is available and, naturally, these should go to those in the process industries who will benefit most from the information we have compiled. If you design or specify heat exchangers, write us on your company letterhead, outlining briefly areas of your interest. A few copies are available to students and non-technical personnel at a nominal charge. Patterson-Kelley Co. Inc., E. Stroudsburg, Pa.

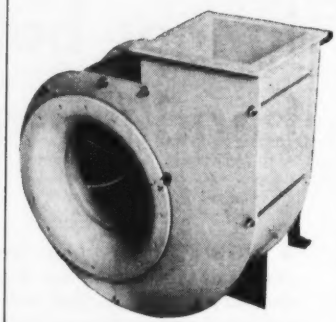
Patterson Kelley
Heat Exchanger Division

Check 2831 opposite last page.

Corrosive fumes handled, repairs, downtime cut, by plastic fan

May save more than $4500 in next 10 years

Problem: An effective method of removing corrosive and poisonous fumes was sought by a large midwestern chemical company. Conventional, coated-steel fan had proved to be unsatisfactory. Impeller, bearings, and shaft had to be overhauled after only eight months service. Unit broke down completely after 18 months, having accumulated more than $1100 in repairs and lost production charges.



All parts of fan coming in contact with fumes are constructed of unplasticized polyvinyl chloride

Solution: Exhaust fan constructed of solid, unplasticized polyvinyl chloride was installed. Unit has heavy, oversize, outboard bearings, designed for tough, continuous service. Fan can operate at well below its critical speed. Similar units are available in wide range of standard sizes.

Results: The plastic fan is satisfactorily exhausting the corrosive and poisonous fumes. Plant personnel estimate that the unit may save more than $4500 in repairs and maintenance — in addition to immeasurable savings in uninterrupted production — during the next 10 years.

(Heil Rigivin #20 plastic fan is product of Heil Process Equipment Corp., 12901 Elmwood Avenue, Cleveland 11, Ohio.)

Check 2832 opposite last page.

ECO ENGINEERING NEWS

the big name in small pumps for the process industries

THAT'S INTERESTING

Air-cooled sailors

Westinghouse scientists are working under a contract from the Navy on a "packaged" air conditioning device aimed at providing the ultimate in comfort for fighting men.

It would be placed inside a protective garment to create an artificial environment.

Thus a sailor would be kept dry and comfortable at temperatures from the below-zero cold of the North to the heat of the tropics.

Sales surge

Production and sales of flexible polyurethane foam are expected to hit 75-100 million lb this year, according to an official of Allied Chemical Company's National Aniline Division. The largest buyers are expected to be the furniture, bedding and automotive industries.

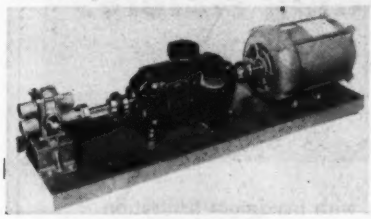
For more information on product at right, specify 2833 see information request blank opposite last page.

Pumping Notes

GEARCHEM Pumps Solve Catalyst Metering Problem

Hanford Nuclear Operations, Richland, Washington, had a real problem in metering, at variable flow rates, a viscous catalyst used to cure silicone rubbers. Impulse diaphragm pumps, as normally used to move this hesitant mass, gave undesirable slug type delivery with unavoidable irregular volumetric yields.

The problem was solved with Eco GEARCHEM pumps in Hastelloy* construction and with Hastelloy gears, driven by Vickers variable speed transmission. These pumps, supplying linear, low capacity flows, provided the essential, dependable metering of the catalyst for uniform end product.



From Viscous Catalysts To Thinner-Than-Water Solvents

Thus, the GEARCHEM Pump proves its great versatility. The requirements of U.B.S. Chemical Company, Cambridge, Mass., were the exact reverse of Hanford Nuclear Operations outlined above.

Here the problem was the exact metering of several thinner-than-water media into a reactor. Suction lift also was required at low rpm.

Several Eco GEARCHEM pumps with Vickers variable speed drives were employed with Rotometers, permitting accurate adjustment of flow rates of each media. The pumps were equipped with TEFLON† gears and floating wear plates, compensating for expansion and contraction and normal end wear of the TEFLON gears. This construction assures sustained high vacuum for necessary suction lift and reproducible accuracy in constant flow metering within plus or minus one per cent.

Battery Builders Choose ALL-CHEM

DELCO-REMY, Division of General Motors, Anderson, Indiana, long time users of Eco ALL-CHEM Pumps for their non-segmentated, non-aerated flows in handling mixtures of phenol, sulphuric acid and water — have recently reordered for their Olathe, Kansas operation. These ALL-CHEM Pumps are made of Carpenter 20 stainless steel with du Pont TEFLON Impellers, bearings and packings.

Immersion Techniques Provide Ultimate Seal

Nothing better illustrates low cost engineering for ultimate requirements with Eco Pumps than the five GEARCHEM units shown above. This is a repeat order from a customer that has used Eco GEARCHEM Pumps, submerged in an inert liquid, to pump against vacuums in the 20 to 50 micron range in the distillation of aromatics.

Immersion techniques meet operational requirements impossible to accomplish with packed stuffing boxes or even the most complicated mechanical seals. They accomplish not only positive exclusion of air from the pumped media, but also safe disposal of hazardous stuffing box leakage into a suitable immersion medium.

High Praise for Zirconium Pump

Typical of many highly favorable comments from users of Eco zirconium GEARCHEM Pumps are the two following:

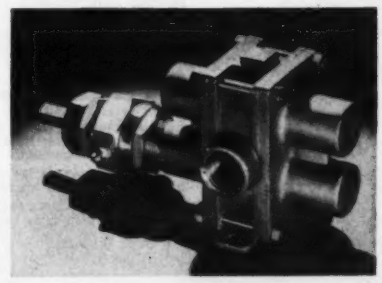
Coast Manufacturing & Supply Co., Livermore, Cal.: "You will probably be interested in knowing that before we installed our Eco pump, we tried two other makes of acid pumps and both failed.

"Our Eco Series 400 GEARCHEM Pump with zirconium body and TEFLON gears has, to date, given us trouble-free, dependable service." (Put in service February 1959, pumping muriatic acid.)

Stauffer Chemical Co. This company reports many disappointing experiences with various makes of pumps to handle methyl sulphonyl chloride until they finally settled on Eco zirconium GEARCHEM Pumps for this problem job. Gears supplied were of TEFLON and shafts of Tantalum.

Petroleum Alkylation Employs Many Monel Pumps

Several refineries have purchased Eco GEARCHEM Pumps in Monel, with carbon bearings and carbon wear plates, metallic gears of Hastelloy C, and grease-sealed, lantern-ring stuffing boxes. These pumps are handling mixtures of hydrocarbons with hydrofluoric acid in various concentrations and viscosities at pressures to 100 psi and temperatures to 300° F.



ECO Products for Handling Corrosive and Hazardous Processing Fluids

ALL-CHEM® Rotary Pumps
MINILAB® Rotary Pumps
GEARCHEM® Gear Pumps
CENTRI-CHEM® Centrifugal Pumps
PUMPMOBILE® Portable Pumping Units
GEAR-VAC® Valves
CHEMICAL DISPENSING VALVES
Factory Mutual Approved

Ask for literature on any or all of these ECO Products

*Union Carbide Trademark. †du Pont Trademark.

All these exclusive features available only with APPLETON

- Standardized Unilet Body permits a variation for mounting of fixture
- Gasket forms a positive seal between Unilet body and dome unit assembly
- Connecting Block houses recessed contact springs through which line wires are connected with screw terminals
- Collector Ring and Center Stud are energized after five full threads have been encased
- Shock Absorbing "Lamp-Lock" Socket prolongs lamp life with its resistance to shock
- Porous Metal Cylinder serves as a flame arrester a... permits breathing of fixture
- "Full-Circle" Venting acts as a louver to aid in an even distribution of heat
- Heat and Impact Resisting Globe detaches itself from fixture when globe ring is unscrewed
- Cast Aluminum Guard has six sturdy braces for fixture protection
- Mercury Vapor Fixtures available for 250 and 400 watt lamp sizes

■ Enjoy 2½ times as much light with maximum protection against burn-out, and benefit from lowest possible operating cost by installing APPLETON Mercury Vapor Lighting Fixtures! Where millions of dollars in capital investments are involved in oil refineries, chemical plants, coal mines, grain elevators, paint factories and other types of businesses with hazardous areas, explosion-proof, mercury vapor lighting is worthy of the most serious consideration. In these "AA-51" Series Vented Fixtures you get all the benefits of proven APPLETON design and sturdy, vibration-proof construction resulting from years of pioneering effort. Investigate APPLETON... the complete, interchangeable line that offers the maximum in protection, as well as a full complement of accessories including mountings, reflectors, and allied equipment. Write for full details!

† 250 Watt Deep and Angle Bowl Types for Class 1 Group D

Mercury Vapor Lamps:
250 watt—C-H5 Clear
—D-H5 Color Corrected
400 watt—E-H1 Clear
—J-H1 Color Corrected
—S-H1 Silver White

Sold Through Franchised Distributors Only

APPLETON ELECTRIC COMPANY
1701 Wellington Avenue • Chicago 13, Illinois

Additional Types of "AA-51" Series Explosion-Proof Lighting Fixtures

APPLETON ELECTRIC PRODUCTS

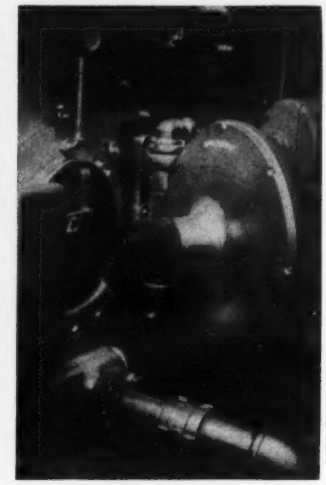
Check 2834 opposite last page.

NEW SOLUTIONS

Oil-to-gas changeover in quick operation saves money

Problem: In planning a pharmaceutical-manufacturing building, The Stuart Co. of Pasadena, California, wanted to have capability of switching from natural gas to oil or other fuel for boilers.

Los Angeles area operates on surplus-demand control for natural gas used by industry. Therefore, it is advantageous to switch to oil or other fuel during peak-use periods when consumer demand is high.



Lower pipe is gas inlet. In switching from gas to oil, circular oil-burner plate is swung into place

The gas supply can be interrupted on a "24-hour or less" notice. (Although it has never happened, "less" could mean 10 minutes.)

Solution: Two 172-hp boilers incorporating gas-oil burner units were installed. Units are bolted to front of boilers.

To convert from gas to oil, operator removes guard bar, swings oil burner into place, tightens one hand bolt and switches fuel valves. In returning to gas, process is reversed. A 5000-gal tank of fuel oil is ready for immediate service.

Rated capacity of gas burners can be developed with natural gas at two- or three-inches burner pressure. Con-

trols permit operation of unit at high or low pressure.

When operating on fuel oil (#6 or lighter), oil is metered into high-speed horizontal cup. Thin film of oil spins from this cup and enters high-velocity primary and secondary air systems.

Air volume is precisely controlled under changing load conditions by means of linkage of atomizing and secondary air controls to oil-metering pump. Burner units incorporate forced-draft fans for operation without stack. Combustion-control instrumentation is also included.

Results: Burner units have permitted quick switching of boiler fuel from natural gas to oil and vice versa. This permits utilization of most economical fuel at any given time.

(RCF gas-oil burner units are product of Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland 11, Ohio.)

Check 2835 opposite last page.

(Boilers utilized in this application are product of Kewanee Boiler Co., 101 Franklin St., Kewanee, Ill.)

Check 2836 opposite last page.

U_3O_8 mill boosts output, slashes chemical costs $0.40 per ton ore

More efficient operating techniques have increased uranium ore throughput and cut chemical costs at Phillips Petroleum Company's Grants, New Mexico, Ambrosia mill. Original design capacity was 1725 tons daily of ore containing 0.24 percent U_3O_8. Recent changes permit plant to process on average of 2200 tons ore per day — a boost of 27 percent. Milling rates have on occasion soared to as high as 2400 tons.

Improved operations have reduced reagent and chemical costs by 40 cents per ton of ore processed.

Studies indicated that leaching rate was being limited by mass transfer of oxygen in the plant's 22′ diam leaching vessels. Mass trans-

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Reliable Control Units

for every industrial application

Among the many hundreds of Allen-Bradley push button and control units, you are certain to find the types best suited to your particular needs. The seven units shown below are a few of the latest additions to the Allen-Bradley *quality* line of control units.

All Allen-Bradley control units—standard duty, heavy duty, and oiltight—have double break, silver alloy contacts—to assure reliable operation. Simple constructions and generous wiring room are outstanding features. Insist on Allen-Bradley control units for *all* of your equipment—you can't go wrong!

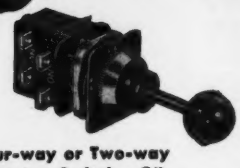
NEW

Encapsulated Pilot Light. Oiltight Bulletin 800T.

Push-to-Test Pilot Light. Oiltight Bulletin 800T.

Time Delay Push Button. Delay is adjustable from 0.5 second to 5 seconds. Oiltight Bulletin 800T.

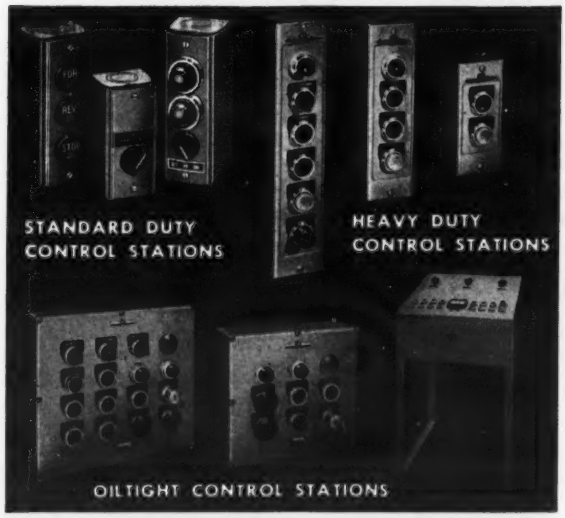
Illuminated Push Button. Combines pilot light and push button in one unit. Oiltight Bulletin 800T.



Four-way or Two-way Selector Switch. Oiltight Bulletin 800T.

Encapsulated Pilot Light. Heavy Duty Bulletin 800.

Double Circuit Push Button. Has 2 N.O. or 2 N.C. contacts. Oiltight Bulletin 800T.



ALLEN-BRADLEY OFFERS the most complete line of standard duty, heavy duty, and oiltight control stations on the market. Send for Publication 6090 today.

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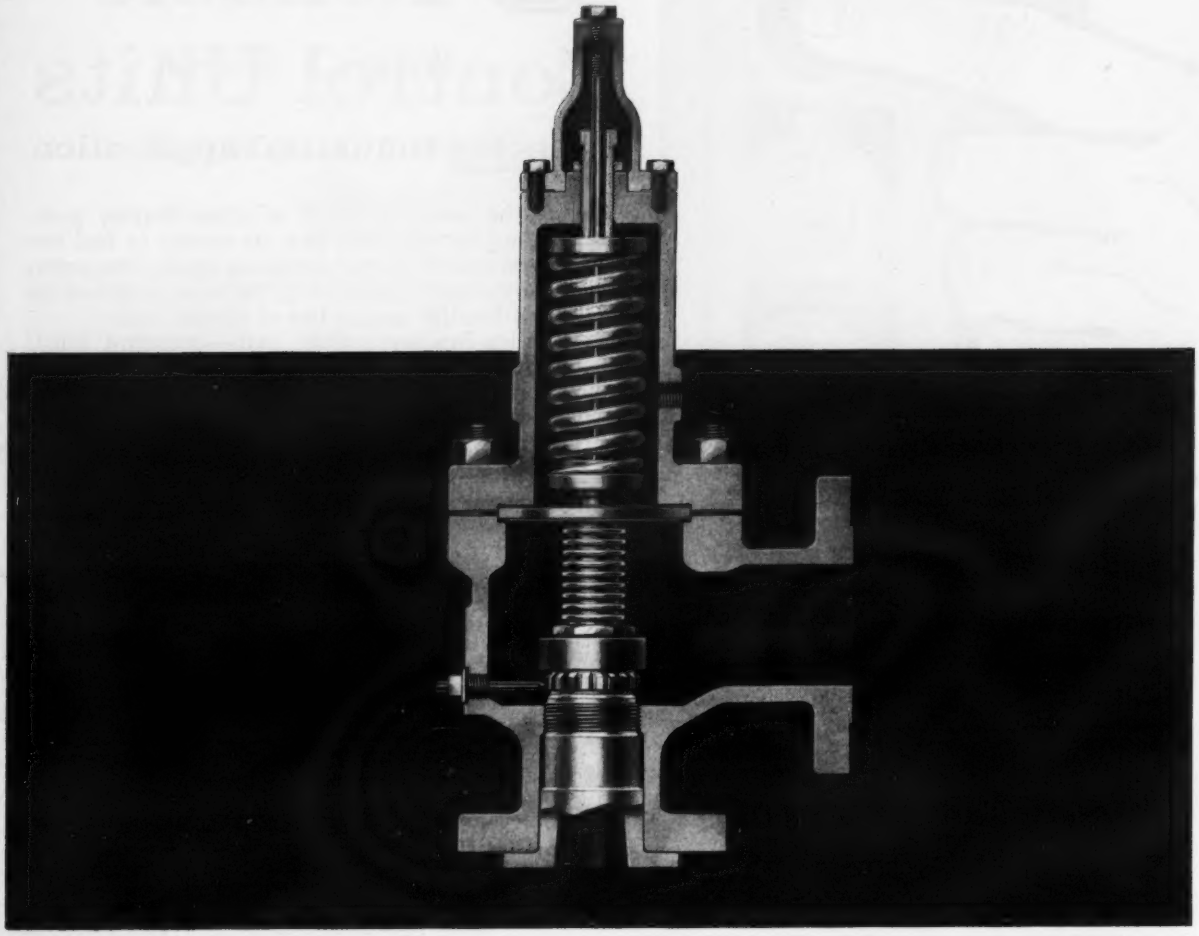
Quality Motor Control

Allen-Bradley Co., 104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

Check 2837 opposite last page.

Look into Lonergan Bellows Valves



Seven exclusive features reduce maintenance costs; provide increased valve versatility.

Like all bellows valves, Lonergan valves are designed to keep corrosive or viscous fluids away from working parts. In addition, they provide a balancing action against a variable back pressure. The similarity between Lonergan and any other bellows valve ends there. *Only Lonergan valves provide:*

1. *Saf-T-Alarm to warn of bellows failure. Alarm may be remotely located. (Optional at extra cost.)

2. Complete interchangeability with conventional valves of the same series.

3. Versatile cap arrangement. Bolted cap is standard and is interchangeable with a packed cap without taking the valve off the line or out of service. Gag facility is included.

4. *Simplified nozzle replacement due to an exclusive knock-out feature. (Optional.)

5. A Hydro model; a patented, true, non-chattering liquid valve. Elimination of chatter ends bellows failure due to excessive flexing.

6. Reserve seating surface obtained from a built-in spare disc.

7. PVC trim, where pressure-temperature conditions permit.

These seven features mean economy for Lonergan valve users —in first cost; in operation; in maintenance. If your plant uses bellows valves, then it will pay you to investigate Lonergan. Series DB bellows valves are described in a new bulletin. Series D valves, available without the bellows, are also described. Write for your copy today.

**Patent Pending*

Lonergan

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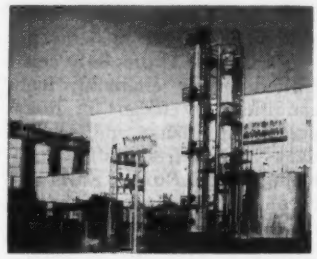
Check 2838 opposite last page.

fer rate was increased by redesigning the oxidation air nozzles.

Filter operation was upgraded by developing a better approach to "plug flow" of



Improved processing methods have increased throughput of uranium mill by 27 percent

wash water through filter cake. This was achieved through use of guar gum as flocculating agent, by permitting thicker cake to build up on filters, and by periodic flushing of organic blinding material from filter cloths.

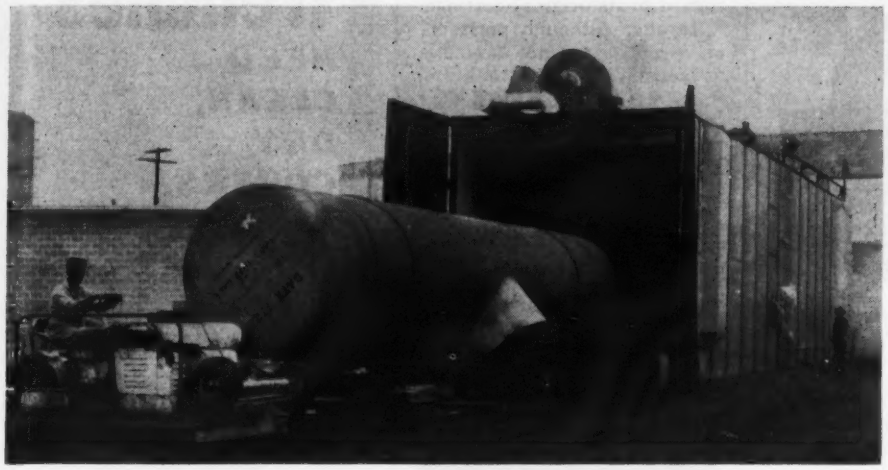
Engineering studies also indicated that soluble U_3O_8 loss could be minimized by utilizing all fresh water to the mill as wash water in final stage of filters. An analysis of operating characteristics determined conditions at which filters could handle all this water.

As a result, soluble loss was slashed to ½ of one percent of U_3O_8 in the ore. Through technical and economic studies it was possible to optimize the quantity of first stage filtrate (uranium rich or "pregnant" liquor) being recycled to leach circuit. This recycle operation resulted in improved precipitation with lower chemical consumption.

(Information courtesy of Phillips Petroleum Company, Bartlesville, Oklahoma.)

NEXT MONTH

Finding the best practical way to process new chemicals can be quite a chore — especially if production experience with the material has been limited. How Metal & Thermit whipped their organometallics drying problem is disclosed in February's New Solutions section.



Tank being moved into oven for baking

Tankcars lined with PVC withstand phosphoric acid

Procedure for applying coating consists of removing tank from carriage, spraying on the plastisol and baking the 8000-gal tank in a large oven

GORDON WEYERMULLER, Associate Editor

Problem: Lithcote Corporaton of Melrose Park, Illinois, was faced with problem of applying a baked-on coating to three 8000-gal tankcars to be used for handling phosphatic or phosphoric acid fertilizer solutions.

PVC plastisol to be used had to be baked in an oven, with heat applied from the outside. Procedure of just circulating hot air to interior was not considered satisfactory.

First, an oven had to be provided large enough for a tankcar. However, tankcar carriage could not be subjected to required heat or it would ruin the bearings.

Solution: An oven was constructed large enough to hold the tankcar, with facilities for providing uniform heat. Oven is 16′ high, 14′ wide and 60′ long — one of very few of this size in the country available for this purpose.

Next tank portion of the tankcar was removed from the carriage. The 20,000-lb tank was then lifted on to another carriage so it could be moved to oven after coating was applied.

First a phenolic primer and then a plastisol PVC primer was sprayed on interior of tank in turn. Then three coats of PVC plastisol were applied in same manner. Thickness of two primer coats was only about one mil. About 40 mils or more was applied with each of the three PVC plastisol coats, for a total thickness of 125 mils.

PVC plastisol is a dispersion at room temperature. When heated, the plasticizer gradually becomes a solvent for the PVC particles and the system, when cooled, becomes a homogeneous film of PVC. Most of the solvent-plasticizer is vaporized during the bake. *To next page*

SLASH washing costs
with John BEAN
AQUABLAST

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IS YOUR CLEANING PROBLEM ONE OF THESE...OR SIMILAR?

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Check 2839 opposite last page.

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Check 2840 opposite last page.

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NOW LAST LONGER

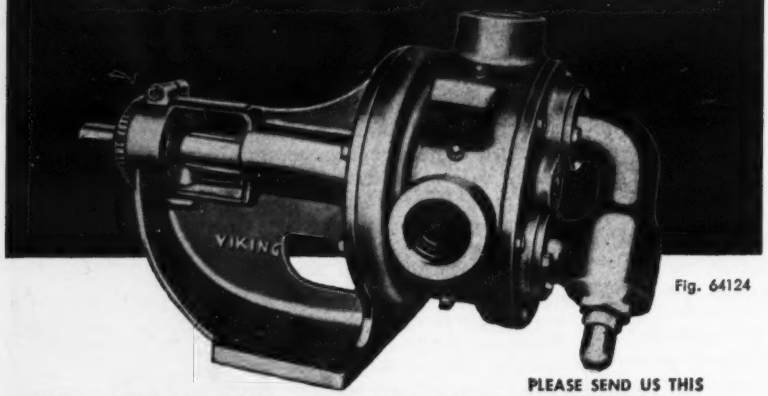


Fig. 64124

Now, you can double or triple pump life with this new heavy-duty Viking. Specially designed with ceramic bearings and mechanical seals to pump paints, inks and other *abrasive liquids. Field tested and proved, pumping liquids from 100 S.S.U. to the heaviest viscous types . . . G.P.M. sizes 3, 6, 12, 16, 25, 40. Let us help you solve your problem.

* Consult factory for recommendations on pumping abrasive liquids other than paints or inks.

PLEASE SEND US THIS INFORMATION:
- Liquid to be pumped
- Viscosity of liquid (S.S.U.)
- Percentage and type of solids present in liquid
- Temperature of liquid
- Specific gravity
- Capacity of pump needed
- Suction lift or head
- Discharge pressure

AND ASK FOR BULLETIN SP-507CC

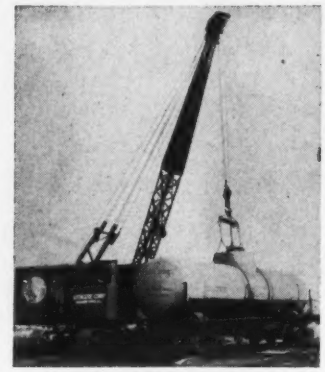
VIKING PUMP COMPANY
Cedar Falls, Iowa, U.S.A. In Canada, It's "ROTO-KING" Pumps
See Our Unit in Chemical Engineering Catalog

Check 2842 opposite last page.

From preceding page

Tank is then placed in oven and heated to 350 ± 10°F for several hours. It is then returned to its original carriage.

Results: Although performance results are not available as yet on the three tankcars, they are expected to withstand the severe service conditions for a long time as indicated by results in other applications and by preliminary tests.



Tank, which weighs 20,000 lb, is removed from carriage with a crane

Tests showed the coating to be satisfactory under total and partial immersion. There was no undercutting and base steel was unchanged. Coating showed good flexibility, adhesion and resistance to hammer impact at 120°F and −10°F.

PVC plastisol is sprayed on interior of tank

One-month corrosion tests with phosphoric acid consisted of successive 15 minute cycles each of heat (150°F) aeration and quiescence. No deterioration or change in adhesion was noted. Analyses on

Plant Trenches NEED CLEAN, DRY COVERS

TRENCHES in floors of industrial plants often house subsurface pipes, valves, etc. Often these trenches are covered with cast iron plates or wooden boards which collect grease, oil or water, making unsafe floor areas.

Trench covers of 75% open Irving metal grating remain safe because they will not collect these substances. In addition to providing drainage and traction, grating sections can be easily removed for access to trenches.

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Check 2843 opposite last page.

commodities after exposure showed no significant iron pickup from base steel panel.

PVC lining is corrosion-resistant, flexible and thick. There are no seams. Cost, being somewhat lower than some other lining methods, runs about $2000 per car for labor and materials.

(PVC plastisol linings were applied by Lithcote Corporation, 5000 W. Lake St., Melrose Park, Ill.)

Check 2844 opposite last page.

(Unichrome Super 5300 PVC plastisol used for linings is product of Metal & Thermit Corporation, Rahway, N. J.)

Check 2845 opposite last page.

(Tankcars to be coated with PVC plastisol were furnished by General American Transportation Corporation, Tank Car Div., 135 S. LaSalle St., Chicago, Ill.)

Check 2846 opposite last page.

Metal-mesh conveyor belt lowers cost of making salt briquettes

Problem: Misshapen salt briquettes and breakage bringing a 30% loss in fines were resulting from conveyors taking briquettes from presses and through drying oven at plant of large salt manufacturer.

But the biggest problem was keeping a heat seal in the oven. Constant conveyor vibration broke flues and seal repeatedly. This resulted in considerable heat loss, higher operating costs.

Solution: Old conveyor was replaced with smooth-running continuous metal-mesh belt. It carries a load of 30 lb/sq ft, resists corrosive and abrasive attack from the salt being carried.

Results: Product appearance is much improved and breakage loss is practically eliminated. Oven flues and heat seals now remain intact, bringing large decrease in operating expense.

(Conveyor belt was made by Cambridge Wire Cloth Company, Cambridge, Md.)

Check 2847 opposite last page.

Water Purity

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American Sterilizer WATER STILLS

Typical Laboratory Still: Electric heated. ½ to 10 gallons per hour capacity.

½ to 500 gallons per hour

* ½ to 500 gallons per hour Evaporator capacity range.
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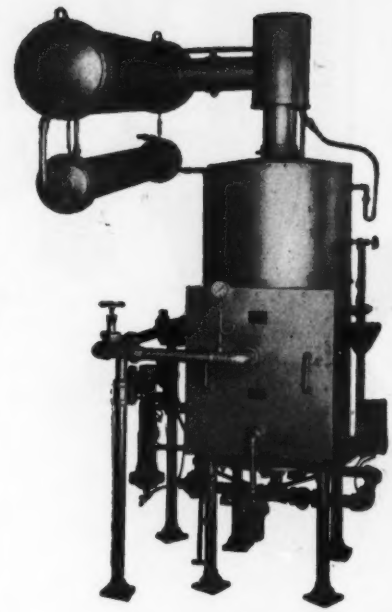

Typical Industrial Unit: Mass production steam heated Still with automatic controls. 50 to 500 gallons per hour capacity.

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Whether the distillate quantity is small or large . . . for exacting laboratory experiments, or for mass processing . . . the purity of water is the same, exceeding the standard set up by the United States Pharmacopeia.

Whatever your water conditions or distillate requirements there is an Amsco distilling system especially adapted to your needs. Write for detailed information . . . Bulletin IC-601.

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5 to 1000 gallons per hour . . . with cation or anion resin in single bed or dual bed arrangement.

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Check 2848 opposite last page.

The Raymond Imp Mill with Whizzer Air Separation is a general utility mill for the chemical, food and process industries. As a compact integrated unit, it provides a clean dust-free system for reducing the material and obtaining a complete and thorough intermixture of the ingredients in finely powdered form.

It is used for the economical production of chemicals, phosphate materials, synthetic resins, pigments, starches, soya flour, pharmaceuticals and many specialty products. It is well suited for making different grades or changing from one material to another. Adequate access doors are provided for easy inspection or cleaning.

Imp Mills are built in several sizes to meet the capacity requirements of small and medium plants. They are economical to install, simple in operation and control with a wide range of application.

Available with Flash Drying accessories for removing moisture while pulverizing — the modern low-cost method of handling moisture-laden materials.

Write for Raymond IMP MILL Bulletin No. 87

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Combustion Engineering-Superheater, Ltd., Montreal, Canada

SALES OFFICES IN PRINCIPAL CITIES

Check 2849 opposite last page.

NEW SOLUTIONS

Package steam generators have top fuel economy, low maintenance

Compact units at Metal & Thermit each supply 10,500 pounds per hour

Maximum operational and functional efficiency are being realized through the use of two package 300-hp steam generators at Metal & Thermit Corporation's $3.5 million organometallic chemicals plant in Carrollton, Kentucky. The units operate fully automatically and practically maintenance-free.

Normally only one steam generator is required during warm months. The other is on standby until cold weather

CP Staff Photo

The two package steam generators can be brought from cold start to full power in less than 30 minutes

arrives. Each can supply 10,050,000 Btu or 10,500 lb 100 psi steam per hour.

Natural gas containing 1065 Btu per cu ft is used for fuel. Approximately 2-4 million cu ft gas per month is consumed. If necessary, units can be switched to No. 5 fuel oil in matter of minutes.

Startup and shutdown is no problem. From cold start to full power takes less than 30 minutes. The steam generator's simple design is reported to result in savings of up to 50% in maintenance costs. At Metal & Thermit, the units are cleaned about twice a year. Each generator has 74 tubes measuring 3" diam x 14' long.

Units are of horizontal, two-pass construction with centrally located furnace around which return tubes are arranged concentrically. Pat-

To page 60

Today's Modern Industry
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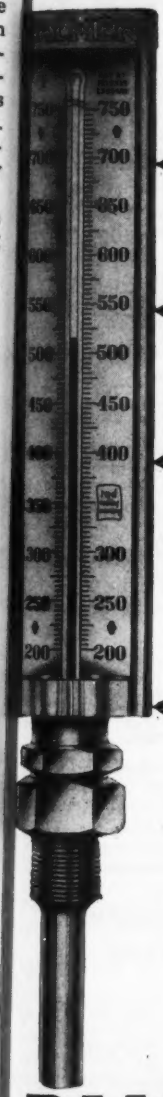

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Sizing Steam Lines

J. H. BELL
6715 Lincoln Avenue
Carmichael, California

and

D. S. DAVIS
Head, Department of Pulp and Paper Technology
University of Alabama

The accompanying nomograph aids one in sizing saturated steam and exhaust-transmission lines in refineries and steam plants. Constructed by means of well-known methods,[1] chart is based on relationship:

$$\log W = c + \frac{d}{b}\left[\log (V-2) - a\right]$$

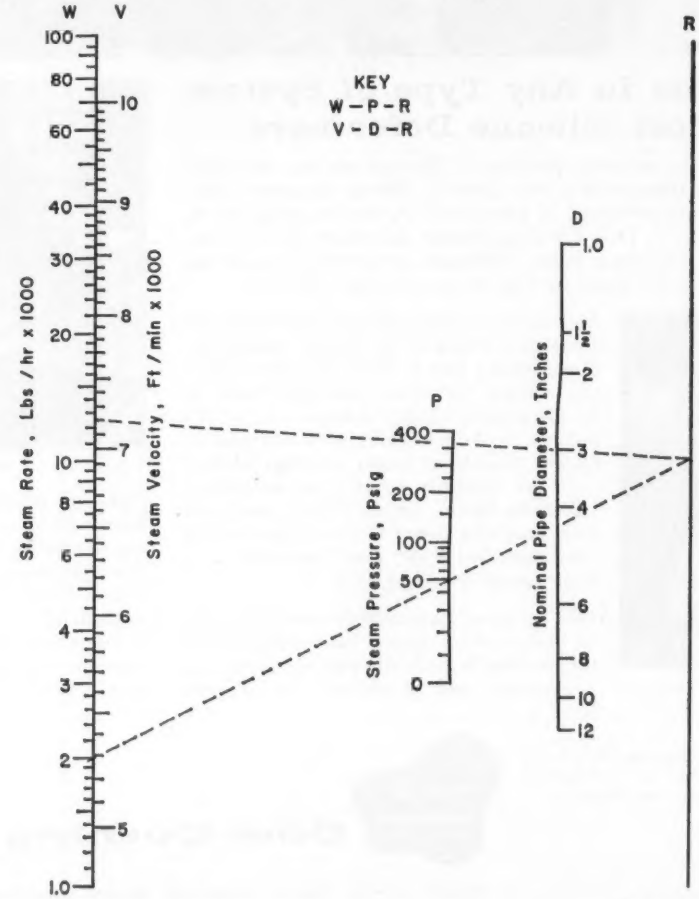
where W = rate of flow of saturated steam, lb/hr x 1000
V = velocity of steam, ft/min x 1000
a and b are functions of D, nominal pipe diameters, inches;
c and d are functions of P, steam pressure, psig.

Typical Example

Use of chart is illustrated as follows: What is nominal diameter of pipe that should carry 2000 lb/hr of saturated steam at pressure of 50 psig and velocity of 7200 ft/min? Connect 2 on W scale and 50 on P scale with straight line, extending it to R axis. Draw straight line from this intersection on R axis to 7.2 on V scale. Note that this line cuts D scale at nominal pipe diameter of 3".

LITERATURE CITED:

1) DAVIS, D. S., "Nomography and Empirical Equations," Chap. 10, Reinhold Publishing Corporation, New York (1955).



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SILICONE NEWS from Dow Corning

Knock-Out Drops For Foam!

Control Foam in Any Type of System with Low Cost Silicone Defoamers

Does foam occur in your process operations? Chances are you can keep it under control at all times with a Dow Corning silicone defoamer. Job-proved in virtually every industry . . . petrochemical, textile, paper, paint, food and many others . . . Dow Corning silicone defoamers knock down the most violent and persistent foam. Eliminate processing slow-downs and boil-overs. Reduce fire hazards. Cut waste and clean-up costs.

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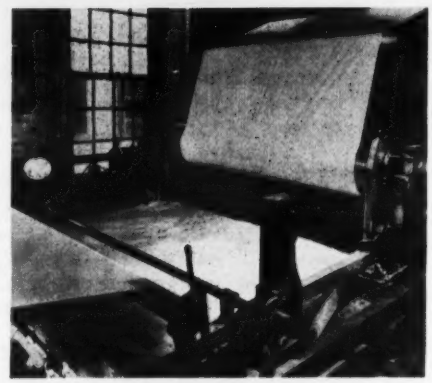
And Dow Corning silicone defoamers are amazingly effective in minute quantities. For example, just 1 ounce of a Dow Corning silicone defoamer prevents foam in 31,250 pounds of dog shampoo, in 59,110 pounds of wire drawing solution, and in 62,500 pounds of paper coating solution . . . are similarly effective in defoaming adhesives, latices, caustic liquor, soap, varnish, emulsion paints and coatings, cutting oils, petrochemicals, food products . . many, many others.

Dow Corning's continuing research study of foam and its control has brought about the availability of silicone defoamers as compounds and emulsions for different types of production systems — and in handy spray cans for split-second defoaming of smaller batch processes. Settle your foam problems once and for all time with a Dow Corning silicone defoamer. A generous trial sample is yours for the asking. Indicate your problem and system — oil, aqueous, nonaqueous, food product, or any other. Write Dept. 3201 for a rapid reply.



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Check 2851 opposite last page.

NEW SOLUTIONS

From page 58

ented "cyclonic combustion" sends flame swirling length of firetube. Separated from the firetube only by a thin layer of air, the flame results in exceptionally high heat transfer. A minimum of 80% efficiency is guaranteed in only two passes. Resulting fuel savings permit such steam generators to pay out in a few short years.

As the need arises, additional units can be added without any major difficulty. Installation is a snap. Only five connections are needed. No boiler foundations or excavations are required. The entire unit can be installed in a few hours. No expensive stack is needed. Almost perfect combustion eliminates smoke and soot nuisance. Only gases escape.

Operating personnel voice nothing but the highest praise for the generators. The building that they are located in is spotless. The units are compact, occupying only minimum of floor space. Each generator measures approximately 8 x 8 x 21′ long. An electronic control system provides for safe automatic operation.

(Cyclotherm steam generators are product of Cyclotherm Div., National-U.S. Radiator Corp., Oswego, N.Y.)

Check 2852 opposite last page.

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Do you have a pet nomograph that could save time for other **CHEMICAL PROCESSING** readers? If so, send it neatly and accurately drawn, with a double spaced, typewritten description to:

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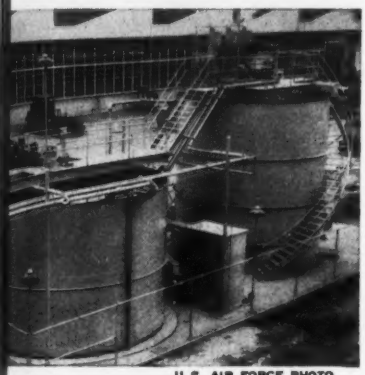

U. S. AIR FORCE PHOTO

HIGH-FLOW, UP-FLOW
CLARIFIER

The Clarifier shown above is part of an ILLCO-WAY ionXchange installation, at a metal-finishing plant, which is used for waste disposal and water recovery. Similar Clarifiers are widely employed to clear up surface waters used by various industries — removing organic matter, hardness, alkalinity, turbidity, color, and iron, as required by specific conditions.

USED AS PRE-TREATMENT

In many instances it is more economical to use a Clarifier in the initial part of a system. Certain water supplies contain organic matter or turbidity which can be removed most efficiently by flocculation, or contain carbonate hardness or alkalinity which can be largely reduced by precipitation — in which situations, a Clarifier is indicated as best. *Let us analyze the water you propose to use, and advise you.*

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NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

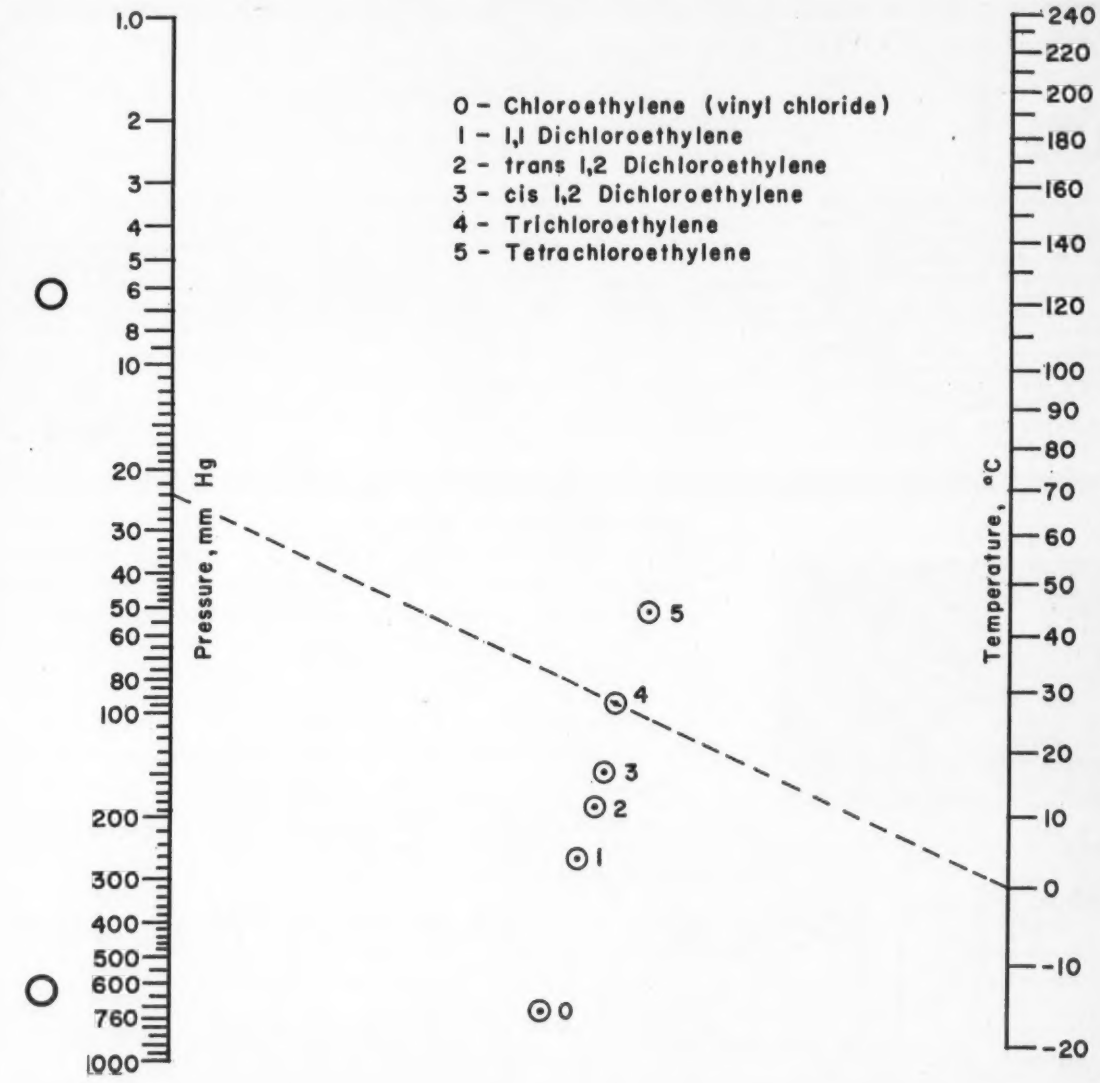
Check 2853 opposite last page.

CUT HERE AND FILE

Vapor Pressures of Chlorinated Ethylenes

JOHN B. GARDNER
120 Holly, Lake Jackson, Texas

To use accompanying nomograph for chlorinated ethylenes, draw straight line through numbered gage points to find vapor pressures at any temperature. Also, draw straight line through numbered gage points to find boiling points at any pressure.



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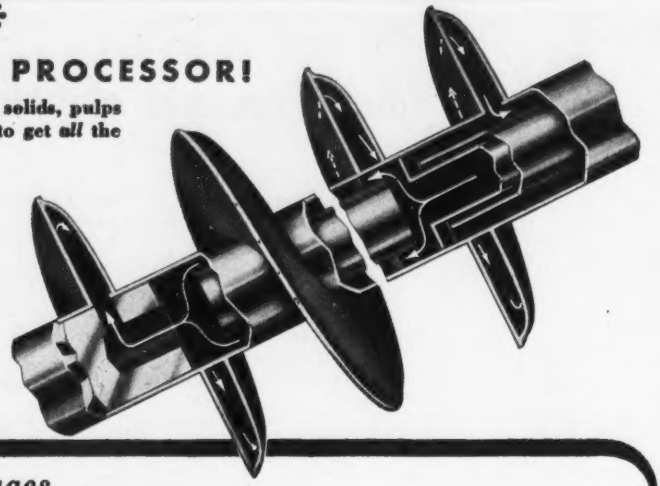
THE holo-flite* PROCESSOR!

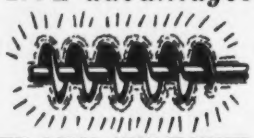
If you have processes where slurries, granular solids, pulps or pastes are cooled, heated or dried, be sure to get *all* the facts on HOLO-FLITE advantages.

HOLO-FLITE handles such processes — *in continuous flow* — in as little as 1/5th the space of other types of heat exchangers. What's more, it is readily adaptable to a wide range of applications — is simple to install and maintain — and provides many other important savings.

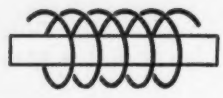


typical HOLO-FLITE *advantages...*

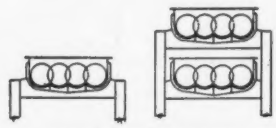
ITS APPLICATION FLEXIBILITY is almost unlimited. It cools, heats, or dries. It handles granular solids, pulps, pastes, slurries and fluids with equal ease. Its heat transfer agent can be water, refrigerant, hot oil, Dewtherm, steam or other liquids or vapors at any of a wide range of temperatures. It cools materials in ranges from 1800°F to 0°F. It heats and dries with hot oil to 600°F...with Dewtherm to 750°F...with steam to 150 lbs. per sq. in. pressure.



THE LARGE HEAT-TRANSFER SURFACE saves space — HOLO-FLITE requires as little as 1/5th the space of other heat-exchange equipment of comparable capacity. Moreover, a more complete heat transfer is effected, resulting in more uniform processing.



ROTATION IS SLOW — granular and powdered solids are handled with practically no dusting — negligible abrasion. There are no dust recovery problems — a further saving in installation, maintenance and operating costs!



ITS OPERATING CAPACITY is readily adaptable to virtually any requirements by simply varying the diameter, pitch, and length of flights, as well as the number of "tiers." Multi-tier units require no more floor space than single-tier installations!

Send for a Free 12 Page Bulletin which gives further time, space and money-saving details on Holo-Flite installation and operating advantages!

"Holo-Flite"—Trade Mark Reg.

HOW HOLO-FLITE WORKS...

Basically the HOLO-FLITE consists of one or more flights of hollow-bladed screw conveyors. The product to be processed moves through a trough housing the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums — *as the product is continuously moved along in a bulk-flow without interruptions!*

There are many money and time-saving applications for the Holo-Flite wherever products are cooled, dried, heated or even calcined. Let our engineers study *your particular* problem and make helpful recommendations. No obligation, of course!

COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
THERM-O-FLEX Hi-Temp Filters
TURBULAIRE-DOYLE Scrubbers
HOLO-FLITE Processors
HI-TURBIANT Heaters

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Check 2854 opposite last page.

NEW SOLUTIONS

Shaft life increased at least four times on brine pumps

Problem: Shafts in brine pumps were snapping in two after crevice corrosion attacked them just forward of packing gland area. This would happen after about nine months service with shaft made from corrosion-resistant metal. Pumps are installed at Olin Mathieson's Lake Charles, La., chemical plant.

One such pump conveys ammoniated brine with analyses (in grams/liter): NaCl-253, CO_2-48, NH_3-83, and sulfide as H_2S-0.85.

Solution: Shafts were replaced with shafts made of Hastelloy alloy C—a nickel-base alloy that shows only 0.00001 ipy penetration rate in sea water. Installation followed laboratory tests performed on a spare assembly.

Shaft on this 1750 rpm brine pump has 1½" diam and is about 32" long. It has lasted over four times as long as other materials tried and is still in service

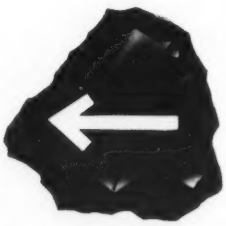
Results: On a recent inspection, shaft installed almost four years ago was still in excellent condition. Use of Hastelloy alloy C has solved what had been a continually recurring problem of corrosion. The same shafts are now being used as replacements in all critical areas in the plant.

(Hastelloy alloy C is a product of Haynes Stellite Company, Division of Union Carbide Corporation, Kokomo, Ind.)

Check 2855 opposite last page.

For more information on product at right, specify 2856 . . . see information request blank opposite last page.

pièce de résistance



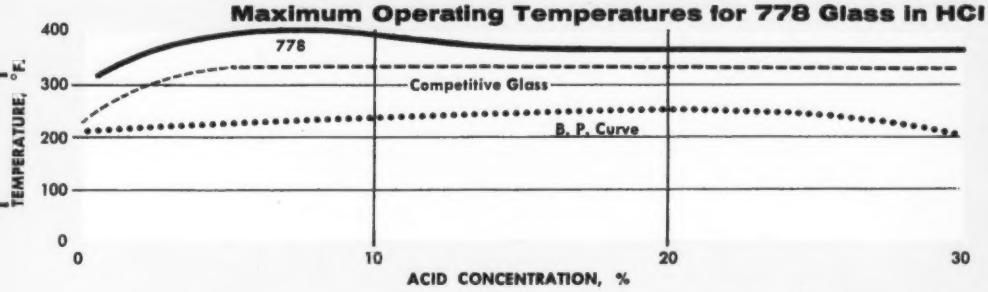
This piece of new Glascote 778 frit is the most corrosion-resistant glass ever applied to chemical processing equipment.

Now! Unmatched **Glascote.**

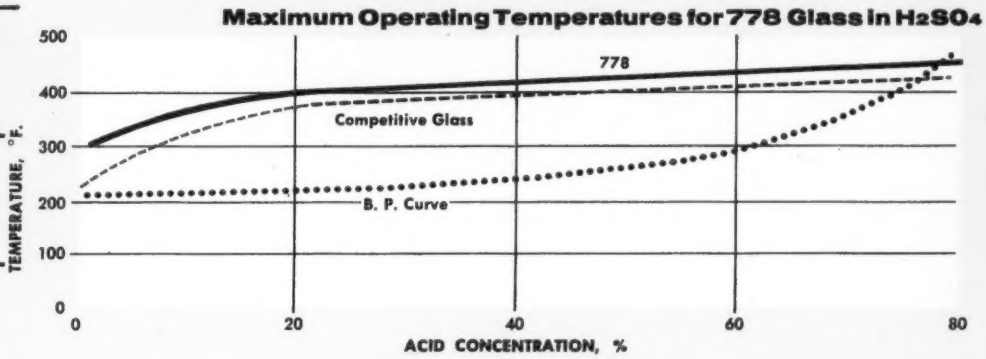
More acid-resistant at up to **75° F** higher operating temperatures

Here's graphic proof that you can speed up reaction time in vessels lined with Glascote 778. The data shown in these charts is substantiated by testing methods presented by D. K. Hoganson at the 1959 annual convention of the American Ceramic Society. We would be happy to send you more complete details on this testing procedure. Drop us a line and your request will receive prompt attention.

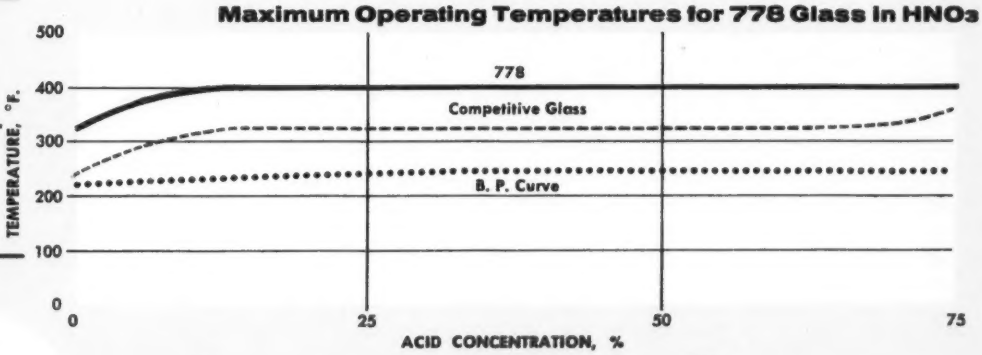
Maximum Operating Temperatures for 778 Glass in HCl

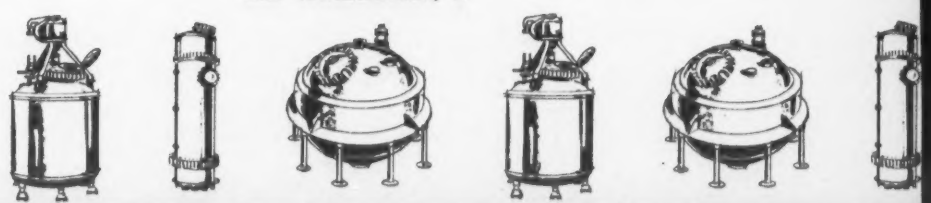


Maximum Operating Temperatures for 778 Glass in H_2SO_4



Maximum Operating Temperatures for 778 Glass in HNO_3



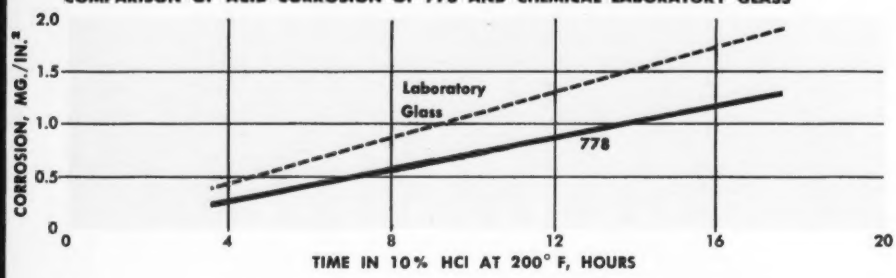


glass-lined chemical processing equipment

More corrosion and thermal shock resistant than chemical laboratory glass

MORE ACID-RESISTANT Ever think you'd see the day when glass-lined steel possessed the acid-resistance of boro-silicate type lab glass? Glascote put new 778 and lab glass to rigid quantitative acid tests — the results proved Glascote 778 not only equal but *superior* to lab glass in its ability to withstand acid corrosion.

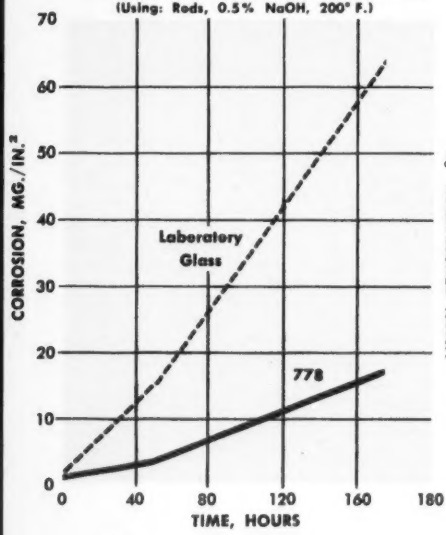
COMPARISON OF ACID CORROSION OF 778 AND CHEMICAL LABORATORY GLASS



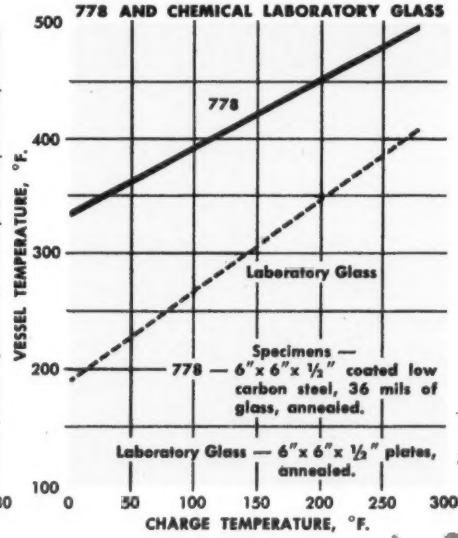
MORE ALKALI-RESISTANT Glascote 778's superior acid resistance was achieved without sacrificing any other protective property. Actually, as an alkali-resistant glass, its superiority over boro-silicate type laboratory glass is even more dramatic.

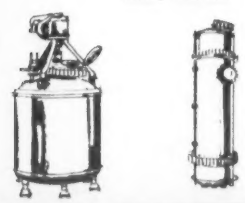
MORE THERMAL SHOCK-RESISTANT We gave Glascote 778 and untempered boro-silicate type laboratory glass shock treatment too! Heating and quenching tests show Glascote 778 able to resist thermal shock at higher temperatures. However, for applications requiring *even higher* resistance to thermal shock, we've formulated Glascote 558 — a special anti-thermal shock glass.

COMPARISON OF ALKALI CORROSION OF 778 AND CHEMICAL LABORATORY GLASS
(Using: Rods, 0.5% NaOH, 200° F.)

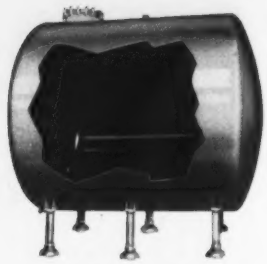


COMPARISON OF THERMAL SHOCK LIMITS OF 778 AND CHEMICAL LABORATORY GLASS





For more information on Glascote's equipment line, please turn page



GLASS-LINED STORAGE TANKS — Single shell horizontal types and vertical units available. Plain, jacketed, open and closed. Built to your specifications.

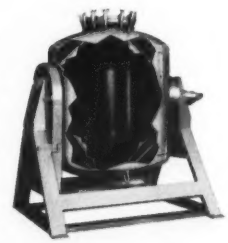
GLASS-LINED HEAT EXCHANGER TUBES — Easily assembled into corrosion-resistant heat exchangers. Standard diameter jacketed pipe, combines with elbows or return bends.

GLASS-LINED PIPE AND FITTINGS — Available in 10-ft. lengths, fittings to ASME standards, in inside diameters from 1½ to 4 in. Six and eight inch and larger sizes to order.

THESE GLASS-LINED PRODUCTS FOR THE CHEMICAL PROCESSING INDUSTRIES ARE ALL AVAILABLE WITH

GLASS-LINED REACTORS — Custom-built up to 8,000 gallons. Standard units from stock range from 300- to 2000-gallon capacities. Feature rotary mechanical seal eliminating contamination from packed stuffing boxes . . . removable blade glass-coated agitators.

GLASS-LINED COLUMNS — Standard and special packed units in glass-on-steel or alloy metals. Built to your specifications in dia. up to 60 in.



GLASS-LINED CONICAL, ROTARY DRYER-BLENDERS — Capacities 5, 35 and 110 cu. ft. as standard, and larger on request. Pressures: tank full vacuum to 25 psi, jacket 65-75 psi.

Glascote®

Glascote offers you reactors (including high pressure spherical production-size types), columns, storage tanks, rotary dryer-blenders, pipe and fittings — all available glass-lined with Glascote 778 for the best protection ever put to steel.

Glascote 778 is the newest addition to an inventory of more than 3,000 glass formulas developed by Glascote and its parent organization, A. O. Smith Corporation. For example, on those specific applications where a producer has a consistent thermal shock problem, Glascote 558 was formulated to give no-spall performance over an indefinite period of time. And this same Glascote 558 is also industry's most abrasion- and mechanical impact-resistant glass.

The equipment shown on this page is typical of many products supplied for laboratory, pilot plant and full scale commercial production, engineered and fabricated to your exacting specifications.

Ask the representative who calls on you for all the facts on Glascote products. Or if you prefer, write direct: Glascote Products, Inc., Cleveland 17, Ohio.

Glascote®

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CLEVELAND 17, OHIO

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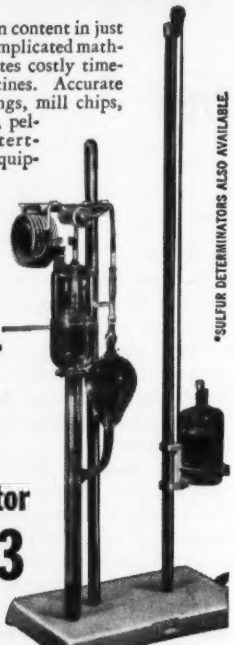
Determine carbon content in just 2 minutes! No complicated mathematics; eliminates costly time-consuming routines. Accurate analysis of borings, mill chips, crushed samples, pellets, etc. Dietert-Detroit testing equipment widely used in company laboratories and institutions of every description for over 18 years.



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*SULFUR DETERMINATORS ALSO AVAILABLE.

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Check 2857 opposite last page.

CUT HERE AND FILE

Continuous Blowdown of Boilers and Cooling Towers

F. CAPLAN
589 Merritt Avenue
Oakland 10, California

A common method of determining percentage of continuous blowdown to keep solids content constant in either boilers or cooling towers requires measurement of chloride content of makeup water and of water in boiler or cooling tower.

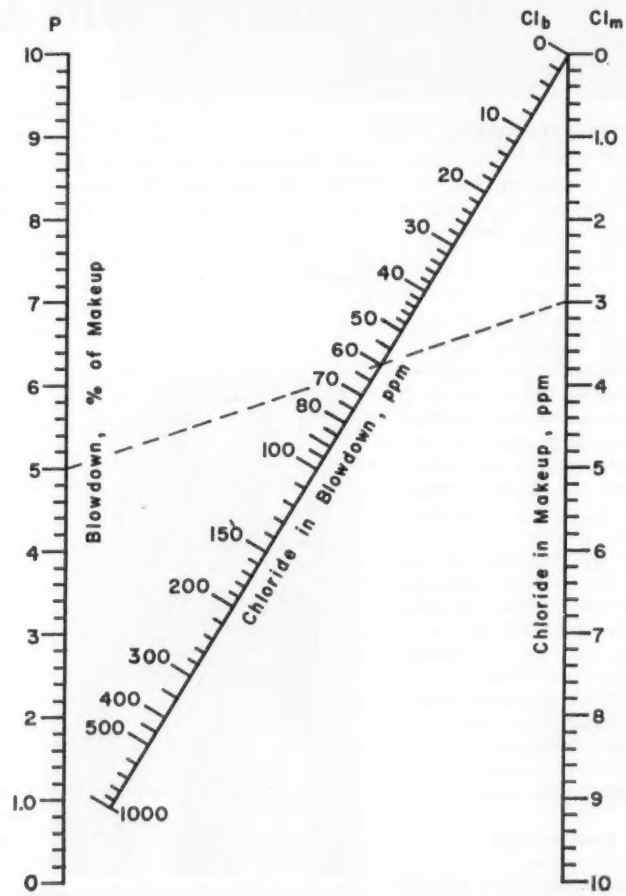
A chloride weight balance gives equation:

$$P = \frac{100\,Cl_m}{Cl_b}$$

where P = blowdown, % of makeup water
Cl_m = chloride in makeup water, ppm
Cl_b = chloride in blowdown, ppm

Typical Example

It is desired to maintain chloride content of boiler drum water at 600 ppm. If makeup water contains 30 ppm of chloride, how much blowdown is required? Align $Cl_m = 30 = 3(10)$ with $Cl_b = 600 = 60(10)$, and read P = 5. This means that 5% of makeup water must be blown down.



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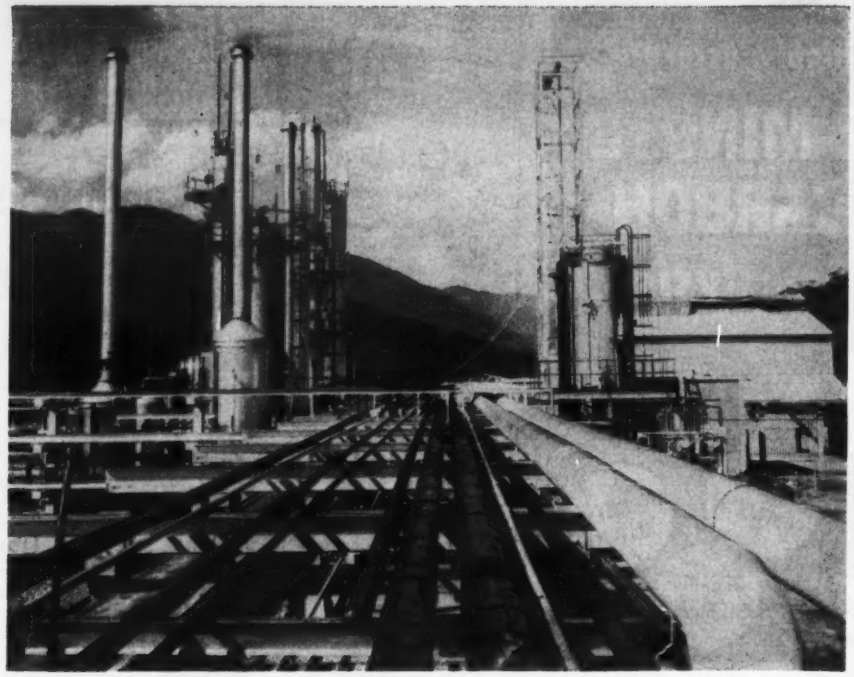


Alba methanol plant is located in Brazil's "Chemical Valley" about 40 miles from Sao Paulo

Based on Bunker C fuel oil, which serves as raw material for manufacturing synthesis gas by partial oxidation method—

Alba, S.A. Methanol Plant in Brazil Uses Catalyst with Unusual Properties

GORDON WEYERMULLER
Petrochemical Editor

with **A. B. BABCOCK, JR.**
Director of Project Engineering
The Borden Chemical Company

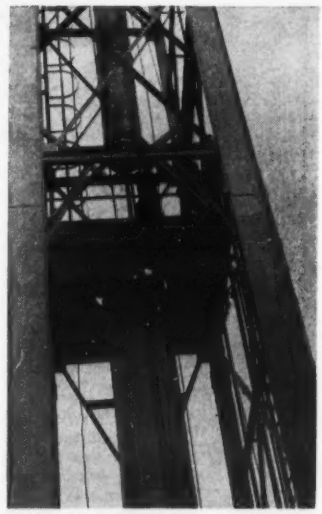
Smooth, quick startup and economical operation during the six months it has been on stream confirm the advantages of the Inventa-Vulcan process being used for producing synthetic methanol at the Alba, S.A., plant in Brazil. Alba, S.A. is a subsidiary of Borden International Ltd.

Among the features of the plant is the relative insensitivity of the Swiss Inventa catalyst to poisoning by trace impurities in the synthesis gas. Process uses fairly simple equipment to produce high-quality methanol of 99.95+% purity. This methanol is later used for manufacturing formaldehyde in two other plants.

Synthesis Gas

Flexibility of the partial oxidation process, used for feed preparation, permits it to use Bunker C fuel oil as the raw material for the manufacture of synthesis gas. This is a particular advantage since Brazil has no natural gas or domestic coal.

Partial oxidation process is a non-catalytic flame reaction of oxygen with the oil. It operates at a pressure of around 400 psig and temperature above 2000°F.



Catalyst basket ready to be lowered into reactor in methanol synthesis section

Bunker C oil is both the process material and fuel in the plant. For process, hot oil is continuously pumped through a pipe loop and back to oil source where a pressure control valve maintains constant pressure within the system. Liquid oxygen of 98% purity is supplied by an adjacent unit.

Shift Converter

Gas formed from partial oxidation, consisting of H_2 and CO, is scrubbed and filtered to remove suspended carbon particles. Part of the gas is then passed through a shift converter where CO_2 and more H_2 are formed and then combined with unshifted gas to obtain the proper H_2 to CO ratio. Resulting gas is then cooled and passed through a standard Girbotol unit, where CO_2 is removed. Purified gas is compressed for methanol synthesis.

Purified synthesis gas is increased to 5500 psi in three stages in a 1500-hp, reciprocating, electrically driven compressor. Gas steam, at ambient temperature, passes through an oil trap, then goes to a converter.

After passing through the catalyst bed in the converter, the gaseous stream leaves the converter and enters a cooler from which condensable products, principally methanol, are drawn. Non-condensable gas leaves the top of the separator and is recirculated through a booster compressor to join fresh feed at the oil trap.

Methanol Purification

Crude methanol from the bottom of the separator goes to a flash drum to be let down to approximately atmospheric pressure before entering the finishing stage. Methanol purification takes place in two distillation columns, a perforated-plate "heads" fractionator and a perforated-plate rectifying column.

Low-boiling compounds and side-product dimethyl ether are taken off overhead from the first column, crude methanol from the bottom. Then higher alcohols are taken off as heart cut from the second column and water as bottoms. Overhead is 99.95+% product methanol.

Catalyst

Tolerance of the catalyst to trace impurities in the synthesis gas, pre-reduction and mechanical stability are some of the features which contribute to long catalyst life.

Catalyst operates with high selectivity and relatively low temperature which inhibits contaminating side reactions — such as formation of methane. This results in an unusually pure crude methanol that permits a comparatively simple and inexpensive finishing facility — essentially only two distillation columns.

A special heater in the reactor facilitates startup and immediately supplies additional heat in event of a breakdown in reaction rate. Thus, rate of reaction is maintained at a virtually constant level while product methanol is of consistently high quality.

Engineering Problems

Some unusual engineering problems were encountered in construction of synthesis gas section. Heavy precipitation during rainy season, soil with only 700 psf bearing pressure and a water table less than two feet below the surface — made it necessary to drive piling under all foundations, including pipe supports. All underground piping is supported on cross-beams under the aboveground supports.

Hot, humid climate makes maintenance on all-steel members almost prohibitive. Hence, pre-cast reinforced-concrete pipe supports and equipment were extensively used.

(Methanol plant was designed and engineered, and construction was supervised by Vulcan-Cincinnati, Inc., 120 Sycamore Street, Cincinnati 2, Ohio. This company is ex-

how to choose a dependable controlled volume pump

STUDY the specifications of a typical controlled volume pump and you can quickly judge its accuracy . . . corrosion resistance . . . even controllability. But you'll find no specifications for dependability or low maintenance, which may be far *more* important in determining a pump's usefulness.

Over the years Milton Roy has studied thousands of pumps, comparing design and construction with service records, in an attempt to pin down the characteristics that contribute most to dependable pumping. Most of these characteristics demand more time consuming methods of manufacture and more expensive materials than conventional designs. All of them have been incorporated into the standard Milton Roy pumps.

Alignment an absolute necessity

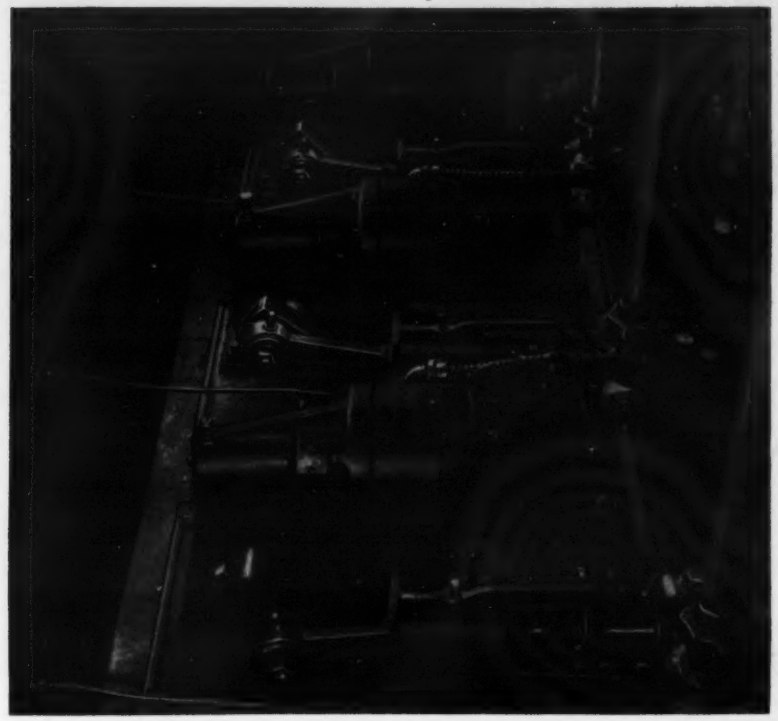
The pump base has more to do with good pump alignment than any other single part, yet its importance is rarely recognized by the pump buyer. Dependable pumping demands an extremely rigid and sturdy webbed base that positively resists deformation and prevents the misalignment that is sure to result. Base pads should be machined to eliminate the problems of aligning and protecting rough cast parts.

Massive pump frames are another necessary bulwark against distortion. Just as rigid bases keep motor, drive, and pump aligned, heavy pump frames keep plunger, packing, and liquid end in line. As a result, both packing and plunger wear more evenly and give longer service.

"Over-Engineering" assures longer life

Typical examples of how dependability must be built into a pump are the crank nuts. Conventional hardware often permits slight crank slippage . . . just enough to throw an undesirable strain on the pump drive. Substituting more expensive brass nuts boosts costs, but, since they can be drawn up tighter, eliminates the problem of slippage.

Other examples of "over-engineering" that extend pump life include generous bearing surfaces that far exceed permissible minimums . . . self lubricating connecting rod bearings . . . special gear tolerances that eliminate grinding wear, vibration, and noise . . . and high cross head length to diameter ratios to absorb unavoidable abuse without injury. Furthermore, the surface of the pump must be protected with a resistant coating as protection against corrosive fume and splash.



These three Milton Roy pumps have been feeding phosphate solution to the boilers of a major East Coast brewer for twelve uninterrupted years. Aside from periodic lubrication and examination, the total cost of parts replaced in that time is just $18.00 . . . twelve sets of packing.

The low cost of dependability

Obviously, a pump with features like these has to carry a higher price tag than one without. But the *cost* of dependable pumping is something else again. As the caption above illustrates, savings gained through years of dependable pumping with minimum maintenance expense far outweigh any slightly higher initial cost. There's little doubt that the more dependable pump always costs less in the long run.

If accurate precision metering of liquids is one of your problems, look again to the enviable reputation more than 75,000 Milton Roy pumps have established for dependable controlled volume pumping.

Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pa.

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CHEMICAL INSTRUMENTATION SYSTEMS

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Check 2858 opposite last page.

CAN ONE OF THESE ASBESTOS TEXTILES GET YOU OUT OF A "HOT SPOT"?

largest selection of asbestos textiles anywhere

It's the high quality Chrysotile asbestos that puts the "muscle" in UNARCO Asbestos Textiles and with this strength and toughness comes superior resistance to heat. No particular secret about it. UNARCO just combines skillful fiberizing, blending, carding, spinning and weaving to offer you the highest quality asbestos textiles at competitive prices.

UNARCO presents a long lineup of textiles from which to pick and choose in a considerable variety of styles, textures, weights and thicknesses. Check the list at right. Which one of these specialized textile products can help you? Or do you have need for a special product that we can develop for you? Whatever your requirements, UNARCO specialists will work with you to meet your needs completely.

TYPES OF UNARCO ASBESTOS TEXTILES

- **Cloth:** Plain, metallic or reinforced . . . all grades.
- **Safety Cloth:** All grades plus extra high tensile.
- **Tapes:** Non-metallic or metallic . . . all grades.
- **Woven and Braided Tubing:** Plain, metallic or neoprene coated or metallic . . . all grades.
- **Lap:** Available in 3 Underwriter's grades.
- **Roving:** Soft rubbed or compacted.
- **Cord:** Plain, wax sized or starched.
- **Yarn:** Plain or metallic . . . all grades.
- **Wick:** Commercial and other grades.
- **Rope:** Commercial and other grades.
- **Wovenstone Wire-Woven Wicks:** A tape with inserted brass wire.

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UNION ASBESTOS AND RUBBER COMPANY • FIBROUS PRODUCTS DIVISION
DEPT. 201, Bloomington, Illinois

Check 2859 opposite last page.

clusively authorized to sublicense the Swiss Inventa process in the Western Hemisphere.)

Check 2860 opposite last page.

(Synthesis gas plant was designed and built by Girdler Construction Company, Commonwealth Building, Louisville 1, Kentucky. Methanol plant also was erected by Girdler.)

Check 2861 opposite last page.

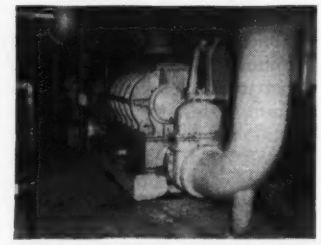
(For further information on partial oxidation process, contact Texaco Development Corporation, 135 East 42nd Street, New York 17, New York.)

Check 2862 opposite last page.

Very little maintenance needed on pumps for vacuum use

Eleven units remove water from paper machine

Among advantages provided by 11 blowers for vacuum service at the Antioch, California plant of Crown Zellerbach are reliability and low maintenance. Majority of units were placed in service in October 1956. They have



These two pumps in series, with common motor, furnish 18-25" of vacuum for couch roll

required an unusually small amount of maintenance since that time. Pumps are used to produce vacuum inside of paper machine suction rolls for removal of water.

Another advantage of pumps is minimum sealing water needed, 4 to 40 gpm, unaffected by water temperature. Units are compact and require relatively less horsepower than other pumps with lower operating speeds.

Here is how eight of the vacuum pumps are used on the wet end of No. 1 Machine, which produces paper for grocery bags, multiwall bags, and various weights of linerboard. This machine produces from 10 to 25 tons/hr, depending upon type of paper. Speed range is 500-1800 fpm.

Applications

One pump supplies vacuum on nine suction flatboxes in Fourdrinier section. Vacuum is 1-3″ Hg.

Two pumps operating in series with single motor furnish vacuum in suction couch roll. Here vacuum ranges from 18″ on lightweight sheets to 25″ on heavy sheets.

Two more units in series with common motor supply vacuum in range of 18 to 22″ in first press suction roll.

Two more singles with common motor supply vacuum in second and third press suction rolls respectively. Vacuums are 5 to 15″ on one roll and 8 to 10″ on the other.

One more single supplies vacuum to Vickery conditioner shoes on first, second, and third press felts. Other three vacuum pumps used in plant on paper machines are for similar applications. Two of these three are single pumps in service with vacuum thickeners.

One for Conveyor

One other pump is used to supply vacuum for a Fuller Airveyor system used to unload bulk starch received in railroad hopper cars. System unloads 14 tons of starch per hour.

(R-C cycloidal blowers for vacuum service are product of Roots-Connersville Blower, One of the Dresser Industries, Inc., 900 Mount St., Connersville, Ind.)

Check 2863 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

FLUOROFLEX-T LINER
Teflon® at its best—applied by the unique Resistoflex process at our enlarged plant shown above

FLUOROFLEX-TS PIPE is chemically inert, corrosion-proof and proven by more than two years of service in the most rugged applications. It is fabricated by a special Resistoflex process so that liner and housing are in thermal equilibrium for maintenance-free, long-life service. Liner is formed over full gasket face of the flange for continuous corrosion protection over a wide temperature range from −100°F to + 500°F.

INCREASED MANUFACTURING FACILITIES now in operation reflect the growing demand for Fluoroflex-TS piping. Corrosion engineers and process designers can depend on Fluoroflex-TS piping backed with full production operations by the company that originated Teflon hose and pioneered the development of Teflon lined pipe.

FOR MORE INFORMATION... Write for Bulletin TS-1A to Dept. 414, RESISTOFLEX CORPORATION, Roseland, N. J. Other Plants: Anaheim, Calif.; Dallas, Tex.

RESISTOFLEX

Complete systems for corrosive service

•Fluoroflex is a Resistoflex trademark, reg., U.S. pat. off.
•Teflon is DuPont's trademark for TFE fluorocarbon resin.

Check 2864 opposite last page.

Atom smashers are helping us find answers to many questions regarding the nature of matter. As with other experimental devices, they must frequently be modified to assure continued progress. Latest change at Brookhaven may fittingly be expressed as . . .

COSMOTRON + BUBBLE CHAMBERS =

Giant magnets on equipment are water-cooled for peak performance. Push-pull connectors on lines permit fast changeovers, result in maximum flexibility

Sausage-shaped beams of protons, traveling at speeds approaching that of light, are shedding more light on the mysteries surrounding the nature of matter. Hurtling out of the three-billion-electron-volt atom smasher at Brookhaven National Laboratories, Upton, L.I., N.Y., the 175,000 miles-per-second speeding protons smash into one of five recently installed bubble chambers housing either liquid hydrogen, propane under a methyl iodide seal, or Freon under a helium pressure seal.

Bubble chambers are successors to cloud chambers. The first, developed in 1953, consisted of a glass tube filled with ether at a temperature that would make it boil when pressure was released. If this pressure release coincides with the arrival of high-energy particles, strings of tiny bubbles form in the wake of their paths through the chamber. Photographed by stereoscopic cameras, the trails show how particles react with atomic components in the chamber.

A typical chamber diameter is 14". Units are surrounded by an insulating blanket of near-perfect vacuum, and lie, like oversized thermos bottles, on their sides.

Surrounding each bubble chamber is a giant electromagnet which directs the bombarding particles through the chamber. Magnet on a 14" diam chamber can generate 17.5 kilogauss — or 17,500 lines of magnetic flux density per sq cm of bubble chamber cross sectional area.

Machine Weighs 1800 Tons

The Brookhaven particle accelerator, known as the Cosmotron, is a big 1800-ton steel doughnut 75' in diameter. It consists of four quadrants of 72 magnet blocks each — 288 blocks in all. A block weighs six tons, and consists of 12½"-thick steel plates welded together at the edges but otherwise insulated from each other. Magnet blocks are actuated by a motor-generator with a large flywheel from which a peak power of 30,000 kw is drawn.

Basic to the entire operation is the theory that as a particle is accelerated and approaches speed of light, continued acceleration increases the mass while speed approaches a nearly constant value. As additional energy is given to a particle, more of it is stored as increased mass, and less as increased speed.

Before protons are injected into the Cosmotron, their energy is first raised in a Van de Graaf linear accelerator where they are speeded up to an energy level of 3.6 million electron volts. About one trillion protons are injected at a time. Timing of the shot must be accurate to within 1/100,000-second.

Protons spiral in around the Cosmotron and immediately pick up speed. Each time around they receive additional energy boosts from a radio frequency power emiting station. Frequency range is from 370 kc at start to a high of 4200 at peak. The protons tend to group themselves into a sausage-shaped bundle as they revolve at increased speeds.

After 0.8 seconds, the bundle has gone around the track more than three million times and the protons have acquired the energy of 3.5 billion electron volts. At precisely the right instant, the bundle is deflected from its path and sent hurtling out of the Cosmotron — bent and focused by a series of giant electromagnets — toward the bubble chamber target.

Water-cooled Magnets

To insure efficient operation, all the magnets — including those on the Cosmotron, the focusing and bending magnets, and the ones on the bubble chambers — must be properly cooled. This is done by pumping cold water through each of the magnet's hollow copper windings. Water for the Cosmotron building is drawn from nearby wells. The discharge is returned to open settling pits, to settle back to the water table from which it came.

Although each type magnet has its own particular configuration, they all operate in much the same way. There is a connection into the cooling main, water headers to each magnet pole, jumper hose to link the poles, and return headers to the discharge line.

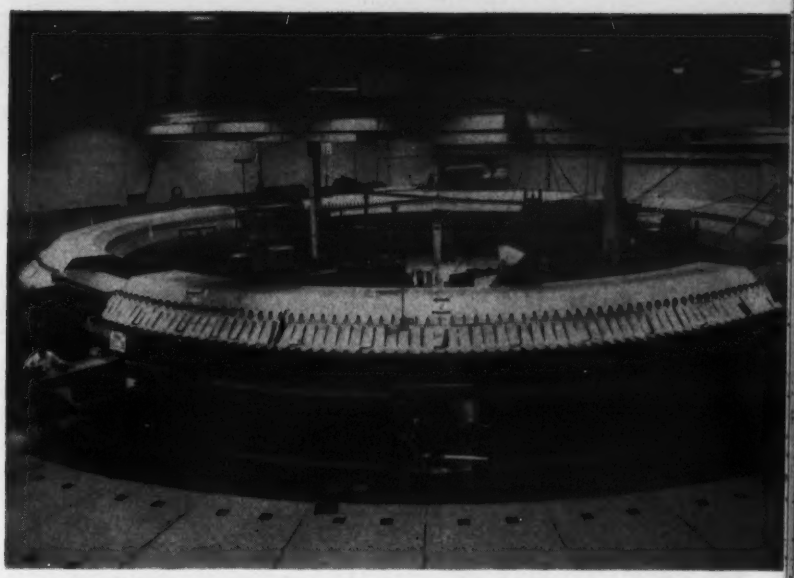
Has Own Cooling Plant

A big problem on the Cosmotron is heat exchange capacity. Heart of the accelerator's cooling system is a 100-ton refrigeration plant that chills water passing through the magnets.

Though connected in series electrically, the magnet turns are water-cooled in parallel. At end of each quadrant of 72 magnets, a copper manifold with 96 outlets connects the water system to the coil ends to form a separate cooling system for each section.

In the bending and focusing magnets which guide the protons after they are ejected from the Cosmotron, the cooling problem is not so much quantity as mobility. There are 30 focusing and 10 bending magnets. They are arranged on the smooth concrete floor of the building in an optically perfect straight

IMPROVED RESEARCH



Three-billion-electron-volt atom smasher has been equipped with bubble chambers — successors to cloud chambers

line connecting the Cosmotron to the bubble chamber.

When a different bubble chamber is being set up for tests, the train of magnets is rearranged to link the Cosmotron to the new chamber. Because of this flexibility requirement, rigid pipe cannot be used to connect magnet's cooling system.

Couplings Save Time

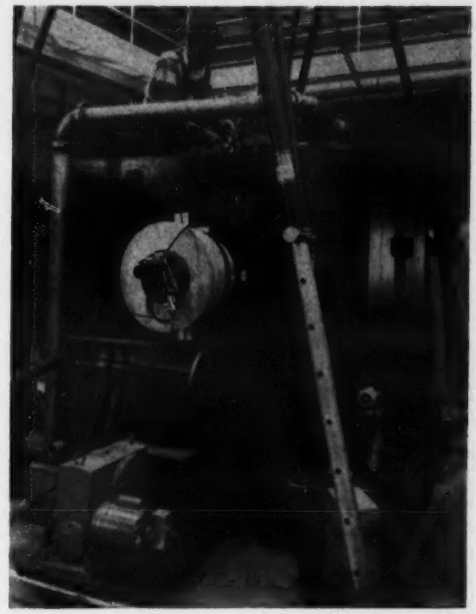
Both inlet and outlet water headers on every mobile magnet are fitted with a double-check valve type push-pull coupler fitting which speeds changeovers. Units provide full-swivel action. They are designed for long service life. Fittings couple and uncouple — without tools — in matter of seconds. A quick push or pull is all that is needed. Couplings are available in sizes ranging from ¼ to 4" in a variety of alloys.

The bubble chamber magnets also have the mobility requirement. Each magnet half has its own cooling system, so each has two permanently attached push-pull couplings. There are a total of four couplings per bubble chamber, with four more at the cooling main.

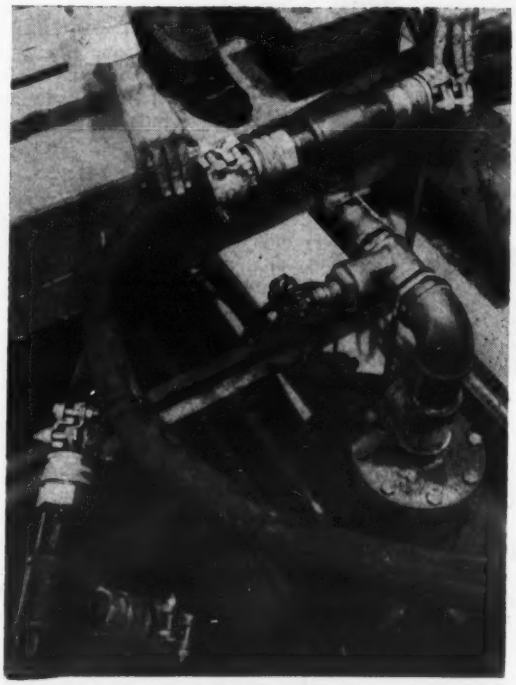
A typical bubble chamber electromagnet has 2" diam fittings. When coupled to the 185 psi cooling main, each magnet half gets about 100 gal water per min. Temperature rise through magnet coils can go as high as 80°F.

(Further information about Quick-Seal coupler fittings may be obtained from Titeflex, Inc., Hendee Street, Springfield 4, Mass.)

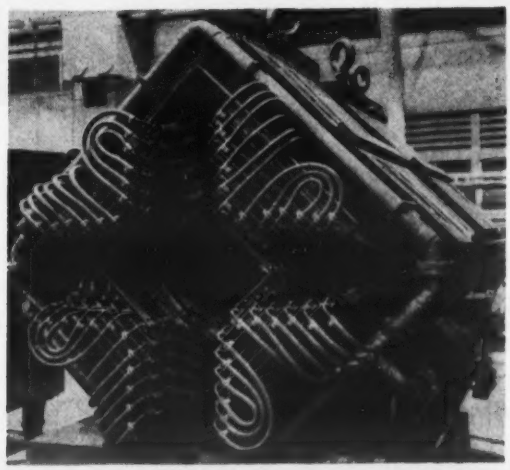
Check 2865 opposite last page.



Giant 15-ton magnet surrounds 14" diam hydrogen bubble chamber. Magnet can generate 17,500 lines of magnetic flux density per sq cm of bubble chamber cross section



To insure maximum flexibility and quick changeovers, cooling water lines are equipped with efficient push-pull coupler fittings. They permit lines to be connected or disconnected in matter of seconds



One of the many focusing magnets that join accelerator to bubble chambers. Jumper hoses connect cooling water from main headers to magnet's hollow copper windings. Magnet is shown prior to installation

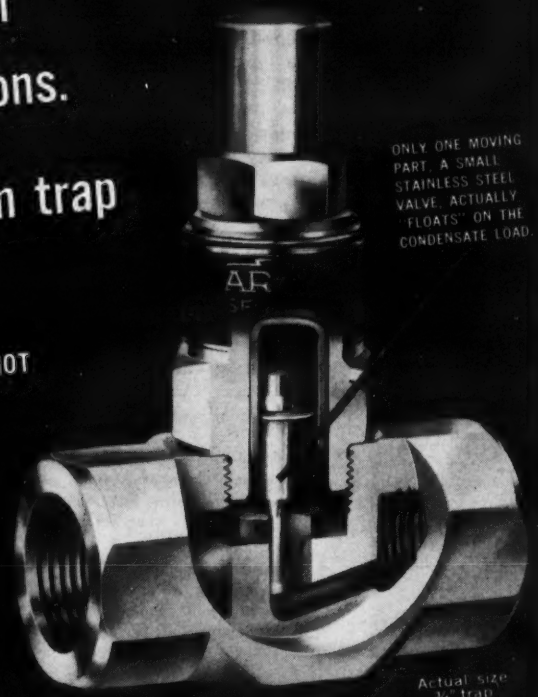
PAY-PLAY

YARWAY IMPULSE* is the only steam trap that continually samples fluid in the line to maintain condensate discharge close to steam temperature, eliminating condensate as soon as it forms.

Condensate seals the small control orifice against steam leakage under all normal operating conditions.

Here's why your best steam trap buy is Yarway Impulse—

1. GETS EQUIPMENT HOT FAST—AND KEEPS IT HOT
2. ONLY ONE MOVING PART
3. LOW MAINTENANCE
4. SMALL SIZE—LIGHT WEIGHT
5. GOOD FOR ALL PRESSURES
6. NON-FREEZING
7. COMPLETE LINE FOR EVERY REQUIREMENT



* A COMPLETE LINE OF STEAM TRAPS, ALL OPERATING ON A PROVEN THERMODYNAMIC PRINCIPLE.

YARWAY impulse®

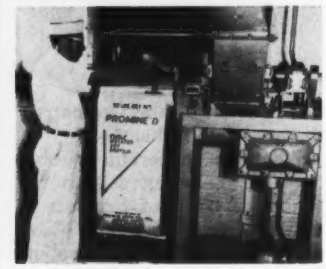
Manufactured by YARNALL-WARING CO., 125 Mermaid Ave., Philadelphia, Pa.
Stocked and sold by 125 Industrial Distributors
Write for free bulletin "The Why and How of Steam Trapping"

Check 2866 opposite last page.

Plant now manufacturing 90%-protein soy product

Other related materials look promising in research

Central Soya's Promine—a food-grade isolated soya protein—is now in commercial production at the company's Chicago facilities. Plant has capacity of about five million pounds of edible protein a year, but optimistic company management is already laying the groundwork for expansion to five times this.



Isolated edible soya protein being bagged

The product, available as either water-insoluble 93%-protein or water-soluble 85%-protein material, will find major markets in the food industry. (This magazine's associate publication, FOOD PROCESSING, pointed out such applications in March 1959, page 37.) Almost free of fat and fiber, the material can be used for gelling, thickening, dough-forming, stabilizing.

The Process

Hexane-extracted, defatted soybean flakes, containing 50-55% protein, are slurried in water to dissolve protein, sugars, vitamins and other solubles. Solids are then screened out, and the protein precipitated with edible mineral acid.

Then follows centrifugal concentration and purification, filtration on a vacuum filter and, finally, spray-drying at relatively low temperatures.

In producing the water-soluble product, called Promine D, cake from the filter is treated with alkali (caustic soda for the sodium proteinate) after it is slurried up for pumping to spray dryer. This

product has a pH of 7.0. Promine R, the isoelectric protein, has a pH of about 4.6.

Other Products

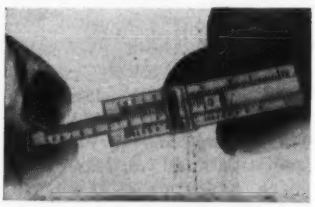
A sugar-free 70%-protein material for food use is now being pilot-planted by Central Soya. An industrial type of 70% protein may have application in formulation of industrial adhesives where sugar can weaken the bond—and elsewhere. The company is planning to have a commercial food grade plant going in Chicago within the next six months.

Another product, still in the research stage, is high in vitamins and other nutrients and contains over 50% sugars. One good use possibility for this is as a "booster" in fermentations and baked products.

(Further information on Promine may be obtained from Chemurgy Division, Central Soya Company, Inc., 1825 N. Laramie Ave., Chicago 39, Ill.)

Check 2867 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



Slide rule tieclasp really works

Miniature tie clasp performs dual function. It can solve problems as well as hold down a tie. Tiny moving glass magnifies numbers. Device is made of sterling silver, costs $4.95. Matching non-operating cuff links are also available.

(Slide rule and cuff links are product of Leslie Creations, Lafayette Hill, Pa.)

TYGON®

Low Cost, Long-lasting Protection Against Corrosive Attack

There's only one sensible way to measure cost when you buy paint to protect processing equipment, and that's *cost per year per square foot of protection.* A few pennies saved in cost per gallon can mean dollars lost if the paint fails on the tank.

That's why you'll find many chemical plants with low cost maintenance records use Tygon Coatings almost exclusively to provide maximum protection at minimum cost.

412F-1

Write for Bulletin 760

U. S. STONEWARE

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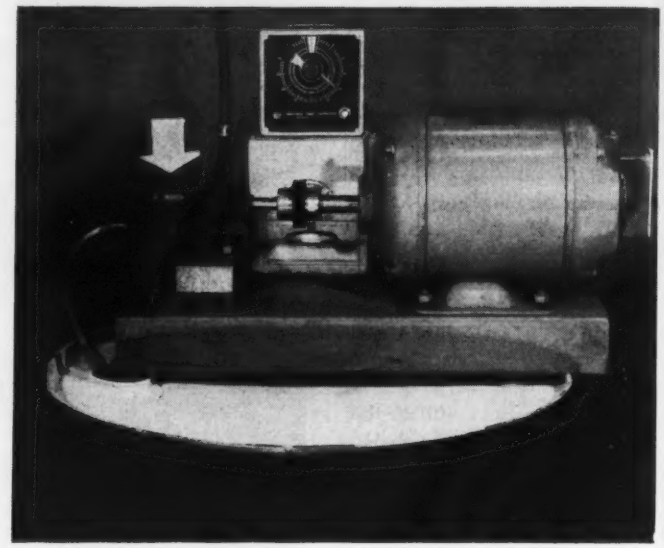
Check 2868 opposite last page.

WHEN FURNACE ATMOSPHERES MUST BE DESERT-DRY... Your gas generator manufacturer is quite likely to include a Lectrodryer when a dry controlled atmosphere is required. In this way he assures the constant dryness so necessary in many metallurgical furnace operations. Lectrodryers are long on engineering — have the built-in extra capacity that always seems to be needed. That's why they may cost somewhat more in the beginning, but cost considerably less in the long run. Ask your gas generator builder for advice on dry controlled atmospheres. For other drying help, write Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd Street, Pittsburgh 30, Pennsylvania.

Lectrodryer® McGRAW EDISON

Check 2869 opposite last page.



Trouble-free operation provided by small rotary pumps

Excellent performance achieved when used as part of unit for dispensing admixture for concrete

GORDON WEYERMULLER
Associate Editor
with **R. E. COLLINS**
Staff Engineer
Johns-Manville, New York, N.Y.

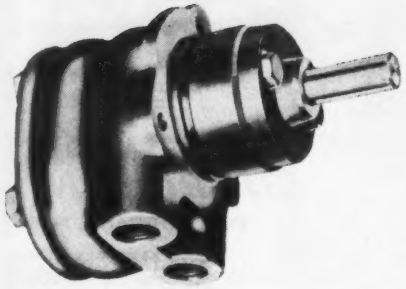
PROBLEM: Johns-Manville required a pump that could withstand rough conditions for use in dispensing company's liquid admixtures known as Placewel and Retardwel. These materials are modified hydroxylated carboxylated acid type, water-reducing admixtures, with and without controlled air entrainment. When added to concrete, they increase strength and reduce segregation and drying shrinkage while improving placeability and impermeability.

Pump was needed that could run dry on suction lifts for short periods without wearing out quickly. A number of pumps and methods for dispensing material were tried without success.

Solution: About five years ago, Johns-Manville started using a dispenser which employs a small rotary pump. This pump has a hardened steel shaft and hardened steel gears, which make it rugged. It has iron bearings and casing.

Pump used for this application has a capacity of 1.2 gpm with pressures to 150 psi. Unit can handle a suction lift up to 25 feet. It can be run in either direction. Packing in pumps used by Johns-Manville is R-7, asbestos impregnated with graphite. Motor is a ¼-hp, 1200-rpm totally enclosed unit. Pump is available in other sizes, ranging from ¾ to 110 gpm capacity.

Dispenser consists of pump



Dispensing unit employing rotary pump can be mounted on drum containing cement admixture

and motor mounted on a base — along with a timer, foot valve, switch, and plastic tubing.

In the typical concrete batching plant, the pump and motor will be mounted on or near drum containing cement admixture on first floor. Switch and timer — with chart relating time to volume — will be on second floor. Plastic tubing is used to transport admixture from first floor to second floor where it is added to concrete.

Results: Several hundred of the small rotary pumps are in service. Few have come back for repairs and they are considered relatively trouble free. Admixture is dispensed with an accuracy of ±2%.

(Series K rotary pump is product of Roper Hydraulics, Inc., PO Box 269, Commerce, Georgia.)

Check 2870 opposite last page.

(R-7 packing is product of Johns-Manville, PO Box 14, New York 16, N. Y.)

Check 2871 opposite last page.

(Dispensing unit is fabricated by Mooney Bros. Corp., Lodi, New Jersey.)

Rental or lease contracts on equipment useful tools for engineers

Useful tools for acquiring new equipment in material handling, packaging, and distribution fields are rental or lease-type contracts.

Term "rental" covers use of equipment or facility for an indeterminate period. A lease covers use for a predetermined period of time.

While economics of short-term use — the fact rental charges will be substantially greater than unit cost — are important, flexibility and/or speed are more likely to be key considerations.

Renting is likely to be more practical than buying or leasing 1) when technology or system is changing rapidly; 2) if buying would involve complicated paper work, extensive bookkeeping or cost records; or 3) when there are special service or location considerations which need to be resolved.

Rental equipment, also, can be acquired and disposed of quickly and rapidly.

On the other hand, lease arrangements offer means for extending production or acquiring new equipment when cash funds are limited, credit extended further than desirable, or company wants to avoid diluting return on investment capital.

Other reasons for leasing include availability of special labor for service situations, ease of acquisition and disposal, and availability of attractive facilities in industrial parks.

("Lease, rent or purchase?" was subject of address before National AMHS-SAM Materials Handling Conference in Cleveland, Ohio, by R. W. Puder and W. R. Hilton, Engineering Service Division, Engineering Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.)

NEPTUNE

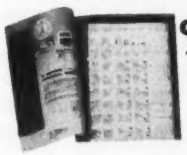
"Meter with a memory"

FILLS A BARREL A MINUTE

A 55-gal. drum every minute filled accurately with no spillage... that's the high speed this "meter with a memory" makes possible for Dynamic Industrial Products Corporation, makers of Vytron safety coolant for metal cutting and grinding. It's Neptune's Repeating Auto-Stop Meter. Set the meter *once*, and it delivers the same quantity accurately every time the valve is opened. It shuts off automatically, right on the nose. Takes only a few seconds to reset to a different quantity.

To fill at this high rate without foaming or splashing, an aluminum tube with a quick-connect fitting is inserted into each barrel in turn. While one barrel is filling, the operator caps the barrel ahead of it and pre-positions the empty one behind it.

Neptune meters now handle hundreds of solvents, chemicals, and food ingredients. Capacities 2 to 1000 gpm. Optional features: automatic ticket printers; explosion-proof Auto-Switch for control of pumps, valves, etc.; remote control systems. Stainless steel meters also available.



GET THE FACTS

Ask for helpful Meter Data Bulletin 566 D P See Neptune Data Pages in Chemical Engineering Catalog.

neptune

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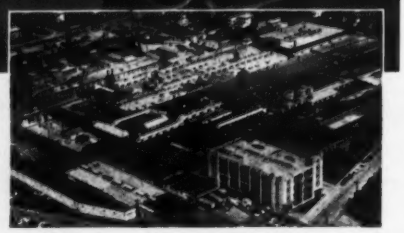
Check 2872 opposite last page.

MOSAIC TILE COMPANY CHOOSES

GARDEN CITY
THERMAL-AIRE FANS



MOSAIC TILE, Zanesville, Ohio, with 7 associated plants and 36 warehouses is famed for quality and service.

America's largest manufacturer of ceramic floor, wall tile and accessories installed Garden City THERMAL-AIRE Fans on eight tunnel kilns at Mosaic's main plants at Zanesville. The fans — 18 of them — are operating in a temperature range of 400°-1300°F.

Mosaic preferred Garden City Fans because their "AIR-COOLED" Shaft gives bearings a positive protection against transmitted heat. Prolonged bearing life means less down time, helps keep production rolling without interruption.

Write for information about Garden City THERMAL-AIRE Fans for high temperatures to 1850°F. Find out how they can help *you* cut maintenance costs.

Garden City Fan and Blower Co. is a member of Air Moving and Conditioning Association, Inc.

GARDEN CITY FAN & BLOWER Co.

Representatives in Principal Cities
803 NORTH EIGHTH ST., NILES, MICHIGAN

Check 2873 opposite last page.

Chemical pilot plant boasts all-stainless, polished equipment

Efficient spray drying evaluation tests are being conducted in recently completed pilot plant at Watertown, Wisconsin. The installation is equipped to handle wide range of products ranging from industrial chemicals to the most delicate foods and pharmaceuticals.

Spray dryer installed in the plant is designed to insure peak product flexibility and performance. Various types of collectors, all interchangeable, insure maximum recovery. Fully automatic control panel regulates air volumes and primary air and reheat temperatures.

All equipment in pilot plant is made of 304 stainless steel, polished to meet high sanitary standards

Other units in plant, including evaporator and heaters, are set up to obtain accurate time and temperature conditions, tailor-made for the product being tested. All equipment is made of 304 stainless steel, polished to meet highest sanitary standards.

(Further information about pilot plant facility may be obtained from Henszey Company, Inc., Watertown, Wisc.)

Check 2874 opposite last page.

Continuous plastic pipe made on location by process

Compact equipment can be mounted on truck

Continuous lengths of plastic pipe can now be manufactured at point of use by means of a recently developed proc-

NOW... 2 TORQUE Ranges
(to 900 Foot pounds)

both from one
STURTEVANT
TORQUE WRENCH

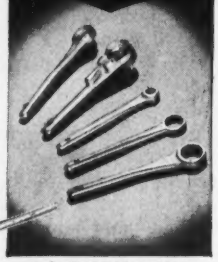
Now you can do high torque work with a Sturtevant Torque Wrench of normal capacity range—small in size—light in weight—with fine increment markings and moderately priced.

With a new Multi-range, Multi-purpose Adapter you can step up the capacity of your Torque Wrench to a new high range and you can plug in any drive end you want . . . Box wrench, ratchet, drive square for sockets.

All drive end accessories are interchangeable and stock items.

In this way each Sturtevant Torque Wrench effectively equals two complete sets of ordinary single purpose Torque tools.

WIDE CHOICE OF INTERCHANGEABLE DRIVERS



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P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

Check 2875 opposite last page.

Unbreakable, Roll-Up...

Dwyer

SLACK TUBE
MANOMETERS

Resilient Spring Steel Scale holds vinyl plastic tube rigid for easy set-up and use . . . yet whole instrument rolls up to pocket or tool kit size.

Read pressure, vacuum or differential with no parallax error . . . full 2-inch sliding zero adjustment.

Complete with plastic ⅛" pipe thread connections, carrying plugs, and adapters. Standard ranges from 8" to 120" water or mercury.

● *Write today for literature and prices*

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P. O. BOX 373-CP MICHIGAN CITY, INDIANA

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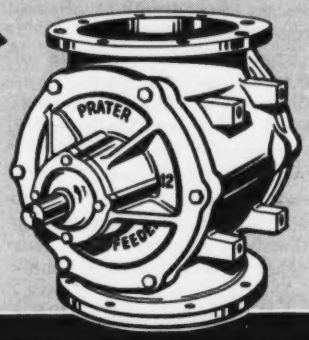
PRATER
ROTARY AIRLOCK FEEDERS
for
DUST CONTROL and PNEUMATIC CONVEYING

Write for "How to Select A Rotary Airlock Feeder" Bulletin P58

the recognized LEADER



FOREMOST BUILDERS OF ROTARY AIRLOCKS

PRATER PULVERIZER COMPANY
1513 South 55th Court — Chicago 50, Illinois

Check 2877 opposite last page.

the right work clothing for the job...
from **WORKLON**®
America's first resource for special purpose industrial apparel

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You can depend on Worklon for the precise apparel to meet your most precise job requirements. Choose from the nation's finest selection of ACID- and CAUSTIC-RESISTANT, LINT-FREE and STATIC-FREE garments for both men and women. Investigate Worklon quality apparel of Dacron, Dynel, Orlon and Nylon. Write for complete information including laboratory reports and test data. All FREE — no obligation.

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Check 2878 opposite last page.

ess. Utilizing compact equipment that can be mounted on a truck or trailer, the new technique could have a big impact in a number of industries. Savings realized in transportation and labor costs alone might cut cost of laying long distance pipelines by as much as one third of present expenditure.

Developed in France by Dr. René Imbert and Mr. Pierre de Vinzelles, the process has been patented in the U.S. Pipe is produced continuously at rate of six to eight feet per minute. Both porous and non-porous pipe can be made. Latter type can withstand inner pressures of 1500 psi or higher.

In the process, layers of glass fiber fabric, impregnated with polyester resins, are welded together into a rigid tube within a matter of seconds by a high-frequency polymerization method. Usually the tube contains about an equal amount by weight of glass fiber and resin. It is also possible to make use of other fibrous materials and to adapt the formula of the thermoplastic resins to the desired characteristics of the finished product.

Machine can make porous or non-porous plastic pipe in continuous lengths at rate of six to eight fpm

Other Uses Possible

Process is not limited to manufacture of pipe. According to the inventors, it can also be used to make other products of indefinite length and constant cross sections of various shapes.

(Further information about the Imbert-de Vinzelles pipe-making process may be obtained from the Council on Public Relations, Inc., 366 Madison Avenue, New York 17, New York.)

a FLUSH BOTTOM VALVE *that* WILL NOT CLOG UP

Designed for Chemical and Pharmaceutical Industries

Strahman
RAM TYPE
Drain Valves

The Strahman Drain Valve is the only valve that cannot clog up. It is so designed that in the closed position the piston or ram extends up into the tank thus preventing any possibility of the outlet becoming plugged.

In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.

Write direct for complete catalogue

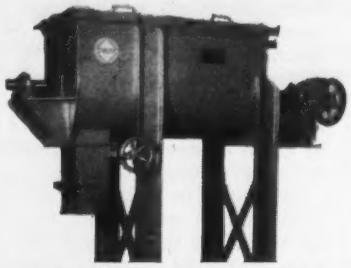
STRAHMAN VALVES, INC.
NICOLET AVE., FLORHAM PARK, N. J.

Check 2879 opposite last page.

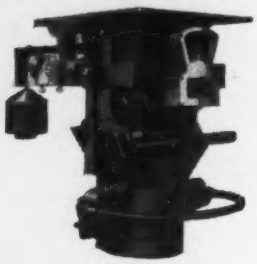
EUREKA

SPECIALIZED EQUIPMENT
FOR THE PROCESS INDUSTRIES

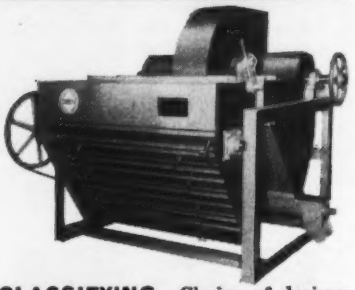
SIZING—New clean cut sizing at high speed without heat. Trial runs arranged in our plant.



MIXING—30 mixers, horizontal and vertical. Mixall and Sanimix in Stainless, and Standard.

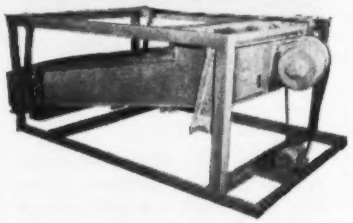


WEIGHING—Portable bagging scales and accessories. 2 models—weigh 25 to 200 lbs. Also packers.



CLASSIFYING—Choice of designs and models in a variety of sizes for individual requirements.

CONVEYING—Bucket elevators, screw and belt conveyors to individual installation requirements.

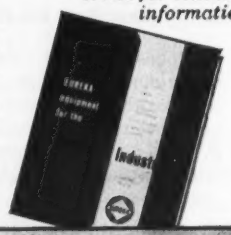


SCREENING—Vibratory closed-circuit rapid uniform screening. 7 sizes in single or double deck models.

ENGINEERED FOR YOUR REQUIREMENTS!

The units shown here are part of the complete line of EUREKA equipment for the process industries. Standard models come in a wide range of sizes and capacities. Custom units can be built to any specifications. All will provide years of dependable, trouble-free service at the lowest possible cost. For further information or descriptive literature, write . . .

Write for technical information.



S. HOWES CO., INC.
MANUFACTURING ENGINEERS • SILVER CREEK, N. Y.

Check 2880 opposite last page.

Produce soybean flakes with as much as 85% protein solubility

Process at low temperature raises byproduct potential

Rich potential of soybean for high-grade byproducts is salvaged through use of modified low-temperature vapor desolventizing-deodorizing process for treating oil-extracted flakes.

Process yields products of 80 to 85% protein solubility as compared to 35% for conventional processes. While latter is acceptable for animal feeds, low level doesn't permit processor of seed oil and meal to capitalize on either demand by adhesive manufacturers for higher quality protein material, or bakers and food processors for enrichment additive.

Key to success of process is the low temperatures, which do not "cook" protein content to insolubility. Low-temperature vapor desolventizer is utilized in conjunction with deodorizer redesigned for sub-atmospheric-pressure operation and fitted with pressure locks to permit continuous operation.

Japanese soybean plant, first to adopt process, produces seed flakes having soluble protein content of 86%.

(Protein extraction process is development of Chemical Plants Division, Blaw-Knox Company, 300 Sixth Ave., Pittsburgh, Pa.)

Check 2881 opposite last page.

Process pilot plant built to 1/50 scale solves full-size problems

Studies valuable in design of commercial equipment

Answers to many industry problems are being provided by a $250,000 process pilot plant built to 1/50 scale by Allis-Chalmers Manufacturing Company at Carrollville, Wis. Among problems being tackled and solved are those regarding agglomeration, heat treating or processing of wide range of raw materials.

Balling, weighing, pellet sizing and grate feeding operations of scale-model pilot plant are controlled by console

Magnetite and hematite concentrates, natural fine iron ores, siliceous bauxite, magnesite, phosphate ores, dolomite and limestone are among materials scheduled for intensive study and evaluation on both a process and economic basis.

Pilot plant utilizes completely instrumented model of double-pass Grate-Kiln system to : 1) demonstrate feasibility of agglomeration processes for wide range of raw materials; 2) determine variations in operating conditions; and 3) develop and study techniques for handling, preparing and processing test materials.

Use of scale-model plant aids in optimizing design of system and components, and helps predict operational information for full-scale, commercial plants.

Facility duplicates full-scale material handling; filtering and blending of wet raw materials; feeding of wet or dry raw materials; weighing; product cooling; proportioning of additives; and balling materials prior to processing in combination of traveling chain-type grate and short rotary kiln.

(Pilot plant at Carrollville, Wis., is operated by Allis-Chalmers Manufacturing Company, Milwaukee 1, Wis.)

Case histories of medical care given five men who received large doses of radiation in accident at Y-12 plant of Oak Ridge National Laboratory are given in 196-page report. ORINS-25 may be purchased for $1.00 from Publications & Public Information Division, Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

NEW LITERATURE

Ideas and New Trends

Packaged hydrogen plants for small-volume users

Volumes to 10,000 cu ft/hr; purity up to 99.995%

Different concept of hydrogen generation and purification is incorporated in packaged small-volume plants which produce 1000 to 10,000 cu ft/hr of hydrogen, up to 99.995% pure.

Facility is fully automated for continuous processing without operating supervision, and completely instrumentated for self-protection of major equipment. Constant monitoring and automatic venting system prevent off-specification hydrogen from being delivered.

Hydrocarbon feedstock is converted into crude hydrogen in steam-methane reforming furnace. Burners, positioned in vertical rows on opposite sides of vertical tubes, are individually adjustable to deliver most effective heat pattern. Since complete combustion occurs within burner cup, burners may be placed near tubes, providing fast heat-up and instantaneous response to controller demand. Even heat distribution along and around vertical tubes eliminates hot spots and minimizes coke formation.

Feed treaters remove sulfide impurities from feedstock.

In purification cycle, impurities are removed with molecular sieves. This technique affords complete removal of impurities; eliminates corrosion problems since system is dry; and reduces maintenance since sieve material is not expended with continuous use. Hot-air heater is key part of molecular-sieve regeneration cycle.

All traces of entrained water are removed from synthesis gas, assuring its being completely dry before entering molecular-sieve stage. Purified hydrogen has dewpoint of −100°F.

(Hydrogen plants are development of Selas Corporation of America, Dresher, Pa.)

Check 2882 opposite last page.

Small-sized nuclear power plants are topic of 60-page report. Capabilities of various concepts are compared. Construction and operating costs are shown. Report TID-8508 is available for $1.75 from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

Radiochemical price list is included in 22-page catalog devoted to radioactive compounds, radiation sources, radioactivity standards, and radiation source kits. Thirty-eight new tritium compounds are listed. Schedule E — Nuclear-Chicago Corporation.

Check 2883 opposite last page.

Specifications guide, consisting of eight-pages, lists ASTM, AMS, and military specifications for silicone rubber. Bul CDS-188—General Electric, Silicone Products Department.

Check 2884 opposite last page.

How capacity of a cement plant was upped from 3600 to 7000 bbl per day while fuel consumption was cut from 1.3 million to 800,000 Btu per bbl is explained in eight-page report. Fact File ER-3241-3 — Fuller Company.

Check 2885 opposite last page.

Plastic molding processes are reviewed in 12-page booklet. Descriptions and properties for nine molding materials are presented. "CDF Moldings" — Continental-Diamond Fibre Corp.

Check 2886 opposite last page.

Delrin molding is topic of eight-page bulletin. Illustrated with photographs, charts, and tables, literature offers data on mechanical, chemical, and physical properties of the acetal resin. "GRC Injection Molded Tiny Delrin Parts"—Gries Reproducer Corporation.

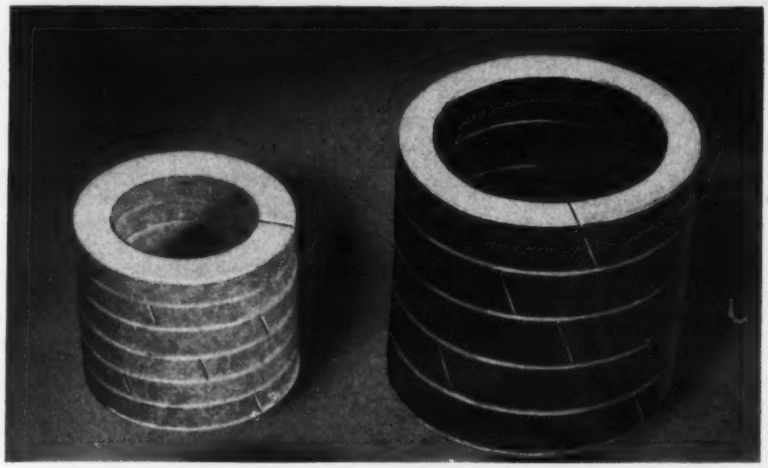
Check 2887 opposite last page.

Design and construction of high-purity carbon dioxide plants is covered in Carbon Dioxide Bul — Girdler Construction Division, Chemetron Corporation.

Check 2888 opposite last page.

Algae in water supplies is subject of 100-page booklet. Report identifies types of algae associated with clean and polluted water, explains how they may help or hinder production of good quality water. "Algae In Water Supplies" may be obtained by remitting $1.00 direct to Superintendent of Documents, Government Printing Office, Washington, D. C.

STILL THE *No. 1* TEFLON* SHAFT PACKING FOR PUMPING CORROSIVES



...CHEMPRO STYLES 101 and 201

(THE ORIGINAL TEFLON SHAFT PACKING)

Chempro Styles 101 and 201 Teflon Shaft Packings, although developed and perfected over 10 years ago, are still the most popular Teflon shaft packings for pumps handling highly corrosive products.

These two stuffing box packings drastically cut packing replacement and maintenance costs. Styles 101 and 201 last for months under corrosive conditions where ordinary packings fail in days and even hours. Successfully seals against bromine, chlorine, butyl extracts, sulphur dioxides, concentrated sulphuric acid, aqua regia, thionyl chloride and organic solvents including halogenated hydrocarbons, etc.

Ideal for use on either centrifugal or reciprocating pumps, at speeds up to 3600 R.P.M. and at temperatures ranging from −118°F. to +525°F.

STYLE No. 101 — Compounded of approximately 94% shredded Teflon and a graphite friction reducer, molded into packing rings.

STYLE No. 201 — Same as No. 101 except that mica is used as the friction reducer.

Both styles are made in sizes to fit any stuffing box. Supplied in ring sets for specific equipment or in single quantity ring orders.

Write for Chempro Bulletin CP 552.

*duPont Trademark

CHEMICAL & POWER PRODUCTS, INC.

9 Broadway, New York 4, N. Y.

The Original Fabricators of Teflon Packings and Gaskets

Check 2889 opposite last page.

Union Leaders Strike Back At New Labor Reform Law

What do leaders of unions having contracts with CPI companies think about the Labor-Management Reporting and Disclosure Act of 1959?

To obtain their viewpoints, CHEMICAL PROCESSING asked presidents of the two major unions in the chemical processing industries for their opinions on these questions:

(1) Do you believe this new legislation will help improve CPI labor-management relations? (2) Do you believe your union will be greatly affected by state governments being given jurisdiction over disputes passed over by the National Labor Relations Board? (3) How do you think this new legislation will affect your union?

Here's how these union officials replied.

O. A. KNIGHT, President
Oil, Chemical and
Atomic Workers
International Union

I do not think this new legislation will improve labor-management relations in the chemical processing industries.

On the contrary, I think it will worsen relations by cluttering up negotiations with a lot of new red tape and regulations. We are getting further and further away from simple, across-the-table negotiations between labor and management.

In the long run, this is going to hurt management as well as labor.

It is ironic to me that so many industrialists propagandize all of the time against government interference in business, yet support this sort of interference with labor. It is ironic because management, too, is being interfered with by this legislation.

It is too early to say how much our union will be affected by the provision giving state governments jurisdiction on disputes passed over by NLRB. This entire law is hazy, and for years it will be subject to interpretation by courts and the NLRB before the picture becomes clear—if it ever does.

This legislation will not necessitate any substantial changes in our operations. We already have made a few trivial changes and of course we will be burdened with more paper work.

Unfortunately, the law may cause more strikes because it makes more difficult some of the peaceful approaches to settlement of disputes and thereby encourages the direct use of economic strength.

I am afraid it would be revealing strategy to go into detail on this; however, we are aware of the fact that the law now permits the use of picket lines in situations where in the past we have not done so.

WALTER L. MITCHELL
President
International Chemical
Workers Union

The full hazards of the new federal labor law will probably not be known for a number of years.

The anti-labor forces in this country moved with shrewd patience in taking advantage of the worst gimmicks in the Taft-Hartley Law. (It was 10 years after that act's passage before we got the whiplash of Section 9 (c) 3, which encouraged union-busting by denying economic strikers the right to vote in NLRB representation elections.)

Presumably, the new law's most objectionable features will be some time in unfolding. We do know one thing for certain: The measure was not drafted by union sympathizers.

At our convention (in October), the International Chemical Workers Union was obliged to draft many changes in constitution and procedure to comply with what we thought were the requirements of the law. None of these changes were what I would consider substantive. None improved the safeguards we previously had for the financial resources and democratic rights of the membership.

In fact, the provisions we have developed over the years—particularly our Trial Manual—are superior. Our Canadian membership has been greatly disturbed by this meddling with their union by a U. S. Congress.

There is nothing in the law that I can see which will help labor-management relations in our jurisdiction. The provisions streamlining NLRB operations may give union organizing campaigns some slight help. But the great bulk of the act offers, on the face, the threat that a union might become so embroiled in litigation and regulation it may lack the energy to deal effectively with employers. So much is vague, so much depends on court and agency interpretation, though, that I hesitate to make specific forecasts.

A number of qualified observers—and I include various congressmen—see the law as signalling a new "Civil War" with its granting to the states jurisdiction on disputes passed over by NLRB.

They see the Southern States striving to create the most anti-union climate possible in order to attract industry from the North. Certainly this "states-rights" proviso encourages regional shenanigans, and since the chemical industry is steadily moving into the South and Southwest, it is of concern to the ICWU.

But the anti-union bias of Southern state governments is not new, nor is Chamber of Commerce lure of "cheap labor" a novelty. And we have survived, and even made progress. We intend to meet this added obstacle, and all the others in the law, with every tactical and legal weapon we can muster—including a new one that our enemies have unwittingly added to our arsenal.

Our union has not been noted for its political action programs, but the passage of the new law—and particularly the manner in which it was passed—has stung our members into full awareness of the truth in the old saying that "What is gained at the bargaining table can be lost in the halls of Congress." They are demanding a new emphasis on education in politics and voter registration, and we intend to follow through to the utmost. Therein may lie our ultimate recourse.

Conclusion of

THE GOLDEN 60's

Continued boom seen for rubber, chemical and plastics industries

GEORGE R. VILA, Group Executive Vice President, United States Rubber Company—All current signs point to the conclusion that 1960 will be another boom year for many in-process materials. Gains are anticipated in rubber, chemicals and plastics.

The outlook for the rubber industry is for capacity, or near effective capacity operations. A record high in consumption is likely to be achieved early in the year. The major demand factor will be a new high in replacement tire sales, the industry's largest volume item.

SBR rubber is expected to encounter the highest demands in terms of absolute tons in its peacetime history. Operations should be up to 80 percent of effective capacity.

Demand also is expected to increase for nitrile, neoprene and butyl rubber. Synthetics such as polyisoprene and polybutadiene are expected to move into the initial phases of commercial production.

Chemicals

The chemical and allied products industry will benefit from virtually all factors that will push our economy upward, and we predict a rise in chemical sales to $27 billion.

The predicted increase in auto production will boost sales of chemicals used in the manufacture of glass, plastics, synthetic rubber, metals and paints. An increase in commercial and industrial building construction, and a relatively high volume of residential building, also will stimulate chemical sales.

Greater emphasis on rockets, missiles and space exploration will spur demand for various chemical fuels and other chemical products.

The steady rise in food needs coupled with more intensive cultivation of farm lands, makes prospects for agricultural chemicals attractive. This points to an increase in the use of fertilizers, pesticides, herbicides, animal health products and feed additives.

An increase also can be expected in the use of petrochemicals. They are expected to account for roughly one-fourth of all chemical and allied products sales.

Plastics

This year promises to be highly significant in the growth of the plastics industry. Several market breakthroughs are hoped for, and if they are achieved several new large-volume commodities will materialize.

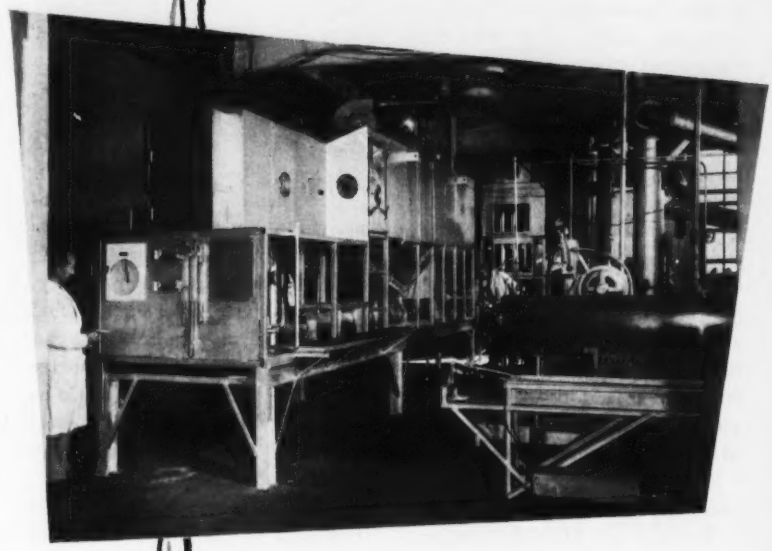
Some of the newer plastics —acrylonitrile-butadiene-styrene resins, polypropylene, fluorocarbons and polyformaldehyde—should show impressive gains.

Sales will continue to rise, but probably at a slightly slower pace. We estimate total production this year will be six billion lb.

Revolutions in plastic processing and fabricating technology may well be stepped up. Much already has been done in this area, but many more developments are promised.

Phenomenal as the plastics industry's growth has been, forecasters now talk of it doubling its current volume of business by 1965.

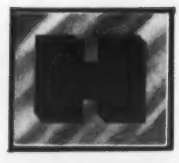
this Henszey Pilot Plant gives you a running start on your competition



Designed and built with *your* profits in mind, this newly-installed process pilot plant is ready and waiting to test and prove your processing ideas.

The scaled-down Henszey evaporating, drying and heating equipment has a capacity of up to 800 pounds per hour. It will handle chemical processing experiments and test runs to *your* specifications.

These complete facilities, including the services of competent Henszey Engineers, are available dependent upon current test schedules. Write today for full particulars.



HENSZEY COMPANY
INCORPORATED
Dept. CP
WATERTOWN, WISCONSIN

ANOTHER HENSZEY PROCESSING *first*

Check 2890 opposite last page.

Rocket Man Learns How to put CONTROL in CONTROLLED DISPERSION

A near-discouraged manufacturer of solid rocket fuels used the equipment shown at right to *prove to himself* some principles of blending which often elude processors that are willing to settle for *less* than controlled dispersion.

His problem? Unless thoroughly and uniformly mixed, the fuel components would not ignite and burn evenly. Failure here could jeopardize vastly expensive rocket components, cause misfirings and hazardous operating conditions. In addition, the completed mix must be quickly cased or enclosed to reduce hazard.

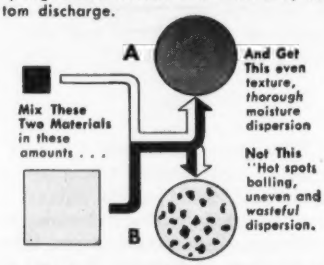
Mix-Muller handled the second problem quickly and efficiently —because all Mix-Mullers are equipped for fast, *automatic* bottom discharge of the mix.

At National's fully equipped *performance laboratory* this manufacturer was able to achieve the desired blend of components through a process of trial and error and elimination of variables. He found Simpson Mix-Muller to be uniquely adaptable for pinpoint control over mixing properties. He found too, that the Simpson Mix-Muller is specifically designed and can be economically equipped for the out-of-the-ordinary mixing jobs which are daily becoming *more* ordinary.

This manufacturer is a satisfied Mix-Muller user today. **You** can purchase the same basic mixer which he is using for as little as $1549.00.* Or, in stainless steel pan and interior, for less than $2995.00.*

Why settle for less-than-perfect blending when you can perfect your *own* controlled dispersion process for less than $1600? *Write for a list* of Mix-Muller users who have done so—on over 100 different mixing applications. And, for the *Handbook on Mulling.*

LF Mix-Muller used in National's *Performance Laboratory* is typical of how a standard Mix-Muller can be equipped for special mixing jobs: (1) Jacket for pressure or vacuum or circulation of heat or coolant (air-tight cover removed); (2) stainless steel interior; (3) explosion proof motor; (4) spring loaded Mullers and automatic, bottom discharge.


A
B
Mix These Two Materials in these amounts . . .
And Get This even texture, *thorough* moisture dispersion
Not This "Hot spots balling, uneven and *wasteful* dispersion.

Here's how *controlled mulling* works:
Diagram shows comparative results of blending a minute amount of one material with large amount of another material in (A) MIX-MULLER and (B) conventional mixer. Savings in raw material, reprocessing time and quality of finished product are the outstanding *rewards* of mulling your product.

SEE OUR ADVERTISEMENT PAGES 1263-1266 CHEMICAL ENGINEERING CATALOG.

*Domestic shipment only, FOB Chicago, Ill.

SIMPSON *MIX-MULLER*® DIVISION

National Engineering Company • 640 Machinery Hall Bldg., Chicago 6, Illinois

HOW MULLING gives you controlled dispersion for better blends:

GOING: Mix is wetted, dispersion of coating media begins as lumps form.

GOING: Smearing, *spatulate* action breaks up lumps as mulling action disperses moisture.

GONE. Agglomerates almost gone as blending nears completion. Mix is homogeneous, thorough.

Check 2891 opposite last page.

Congressional Preview

From page 23

are watching with interest Senator Kefauver's hearings on drug industry pricing practices.

In the closing days of the last session, Senators Smathers, Lausche, Johnson and Magnuson joined in censuring the drug industry for its alleged high prices. Senator Smathers told CHEMICAL PROCESSING he has received many letters complaining about the

Senator Magnuson (D., Wash.), one of a group of senators who has censured the drug industry for alleged high prices

cost of drugs, and this is a "very serious matter with me."

He said he will "watch carefully" what happens in the hearings and proceed accordingly. It is reported other senators also have been receiving mail complaining about the cost of drugs.

The Senate Antitrust and Monopoly Subcommittee which is conducting the hearings, has been deluged with "we-agree-with-you" letters from the public, a committee spokesman said.

Concern is at a high pitch that this type of inquiry may provide eager Congressmen with an election-year "cause."

Tax Deferral

The House Ways and Means Committee staff is at work redrafting a bill which would provide for tax deferral on profits earned in overseas operations until the money comes back to the United States.

Hearings were held on a tax incentive bill (H.R. 5) last session, and in the closing days the committee approved a watered-down version of the original legislation.

At that time, Chairman Wilbur D. Mills (D., Ark.), indicated a new bill would be drafted. Business is behind tax incentive legislation, with this particular bill given an even chance of passage.

Other tax legislation is expected to come out of lengthy Ways and Means Committee hearings on revision of the tax laws (October CP, page 9).

Topics of special interest to CPI which may result in remedial legislation are depreciation allowances, percentage depletion and research and development expenditures.

Tariffs

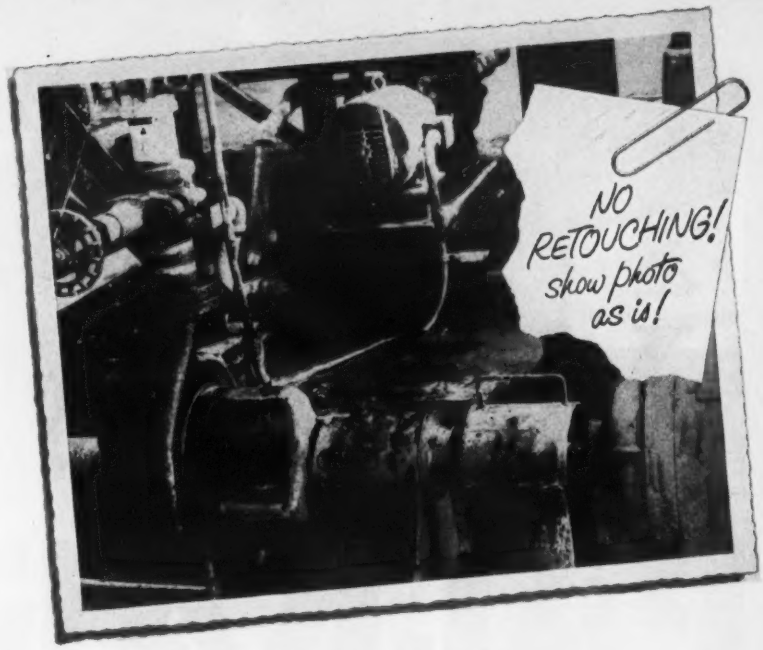
While no major substantive legislation is due on tariff matters, it is possible there may be some legislation reflecting what one Senate specialist calls a "distinct trend toward additional protection."

He told CHEMICAL PROCESSING legislators are worried about the loss of American dollars — too many goods coming in and too many dollars going out. This could result in such measures as strengthening the "escape clause" provision, and more mandatory controls.

Although the Administration is traditionally opposed to altering rates of duty, it may become necessary to reverse this position, if the protectionist trend continues.

A discussion of existing duties is almost a certainty if the revised schedule of tariffs comes up before Congress (December CP, page 11). Even though the schedule did not substantially change duties, consideration of it could serve as a jumping-off point for a broader discussion of the entire trade and aid picture.

In any event, although plans for specific legislation are characterized as "nebulous," the prevailing protectionist mood may stir up action when the subject is brought up. There are, of course, many ways to slow down the outflow of dollars: cutbacks in



At West End Chemical Company

OLIVER TYPE "L" PUMPS handle 60-80 gpm of brine filtrate in continuous service

There's no sense in prettying-up a photo like this—it tells better than words the kind of duty for which Dorr-Oliver pumps are designed. These particular pumps are in service at the West End Chemical Company, California, a division of Stauffer Chemical Company. 24 hours a day, 7 days a week, they handle 60 to 80 gpm of brine filtrate—one step in a giant processing operation that produces soda ash, salt cake, borax and hydrated lime.

Oliver Type "L" Pumps are of alloy metal construction, with lifetime grease or oil lubricated bearings and choice of either mechanical seals or stuffing box. Five standard sizes take care of most needs. They are one of the three specialized types of pumps made by Dorr-Oliver for corrosive liquid or slurry handling service—the only complete line for coverage of all chemical industry requirements. Write to Dorr-Oliver Incorporated, Stamford, Connecticut for comprehensive new bulletin—or contact a nation-wide network of representatives and distributors.

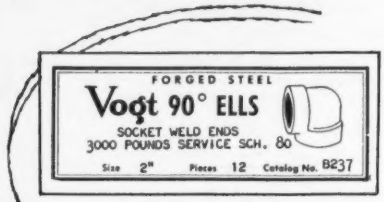
OLIVER: Reg. T.M. U.S. Pat. Off.

DORR-OLIVER INCORPORATED
WORLD-WIDE RESEARCH · ENGINEERING · EQUIPMENT
STAMFORD CONNECTICUT U. S. A.

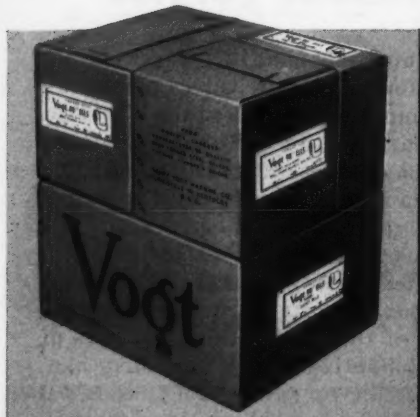
Check 2892 opposite last page.

Vogt PACKAGED

FORGED STEEL FITTINGS, FLANGES and UNIONS



Complete product identification and data on label attached to carton.



Vogt modular designed cartons give added handling and storage space economies. All dimensions are in multiples of 3 inches.

for MATERIAL HANDLING ECONOMY

1 Easy Inventory Identification

2 Easy Handling

3 Protection Against Damage

Handling and inventory costs are held to a minimum with Vogt modular packaged forged steel fittings, flanges, and unions. The small cartons, of restricted weight, are appreciated by the distributor and user alike for their easy handling and the protection given the products against damage.

The label attached to each carton completely describes and pictures the product and gives the quantity, size, end type, pressure, and catalog number.

Write for Folder PF-1 for complete data on quantities and weights of the items as packaged in various sizes of cartons.

Address Dept. 24A-FCP

HENRY VOGT MACHINE CO.
P.O. Box 1918 Louisville 1, Ky.

SALES OFFICES New York, Chicago, Cleveland, Dallas, Camden, N.J., St. Louis, Charleston, W.Va., Cincinnati

Check 2893 opposite last page.

Congressional Preview

From preceding page

foreign aid and loans, foreign incentive tax deferrals — or tackling the problem at the marketplace.

Antitrust

In the antitrust area, two leftover bills on which there may be action this session are a pre-merger notification measure and one which would allow company documents to be subpoenaed on grounds of possible antitrust violations.

The first bill, which would require large companies to give advance notice of any intention to merge, is before committees in both houses for action. The subpoena bill (S. 716), passed by the Senate, is now pending before a House antitrust subcommittee.

Other possible action may include proposed legislation on federal agencies that regulate business and business procedures. Such legislation probably would provide more pre-hearing conferences, larger staffs and more authority for hearing examiners.

U. S. Attorney General Rogers says regulatory agencies may need a reappraisal and possible changes. "The entire field of administrative law and of government regulation may require a searching re-examination of some of the premises on which we have based our conclusions," he said.

Process Dynamics

From page 22

the less likely is he to back early opinions as to what will practically serve our future designers.

Relative relationships of major factors under consideration today, are shown in outline in the accompanying figure on page 22.

Transport processes now are shown as embracing movements of matter (mass), momentum and energy into and out of the process. *Chemical reaction kinetics* are now regarded as basic driving

To page 84

THAT'S INTERESTING

Fatal charm

Chemistry can cause the quick demise of the male gypsy moth if he isn't careful.

U. S. Department of Agriculture chemists have devised traps containing a synthetic female moth scent.

The chemical baits lure Mr. Moth to his doom when he seeks basic foods, host plants and a mate.

Beach note

Paper bathing suits are now in the experimental stage. Just the thing to write home on!

Ultra-fine

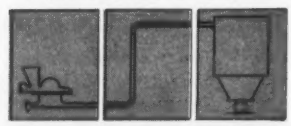
Metal powders with particles one-millionth of an inch in diameter can be produced by new method which is result of research conducted by National Research Corporation. Particles are 1000 times smaller than any previously obtainable.

For more information on product at right, specify 2894 see information request blank opposite last page.

THE ORBIT OF ACCEPTANCE . . .

It's still young enough to be called "new" . . . but the MIKRO-PULSAIRE is actually a veteran that's proving itself all over the world on virtually every type of product recovery and nuisance dust collection job. If you're looking for assurance of around-the-clock recovery, full-time automatic cleaning and absolute minimum maintenance, you'll find it in the MIKRO-PULSAIRE. It's a completely simplified unit, as the basic components illustrated above will show you . . . and yet it delivers a filtering efficiency of 99.9% plus, on a wide variety of dusts. Engineered for economy, the exclusive Mikro jet-action principle eliminates gears, cams, chains and other high replacement-cost parts inside the cabinet, and guarantees longer bag life, as well. There's a MIKRO-PULSAIRE for every collection job, including new modular construction units with capacities to any known requirement. Write for Bulletin 52A!

PROCESSING SYSTEMS



MIKRO-Products

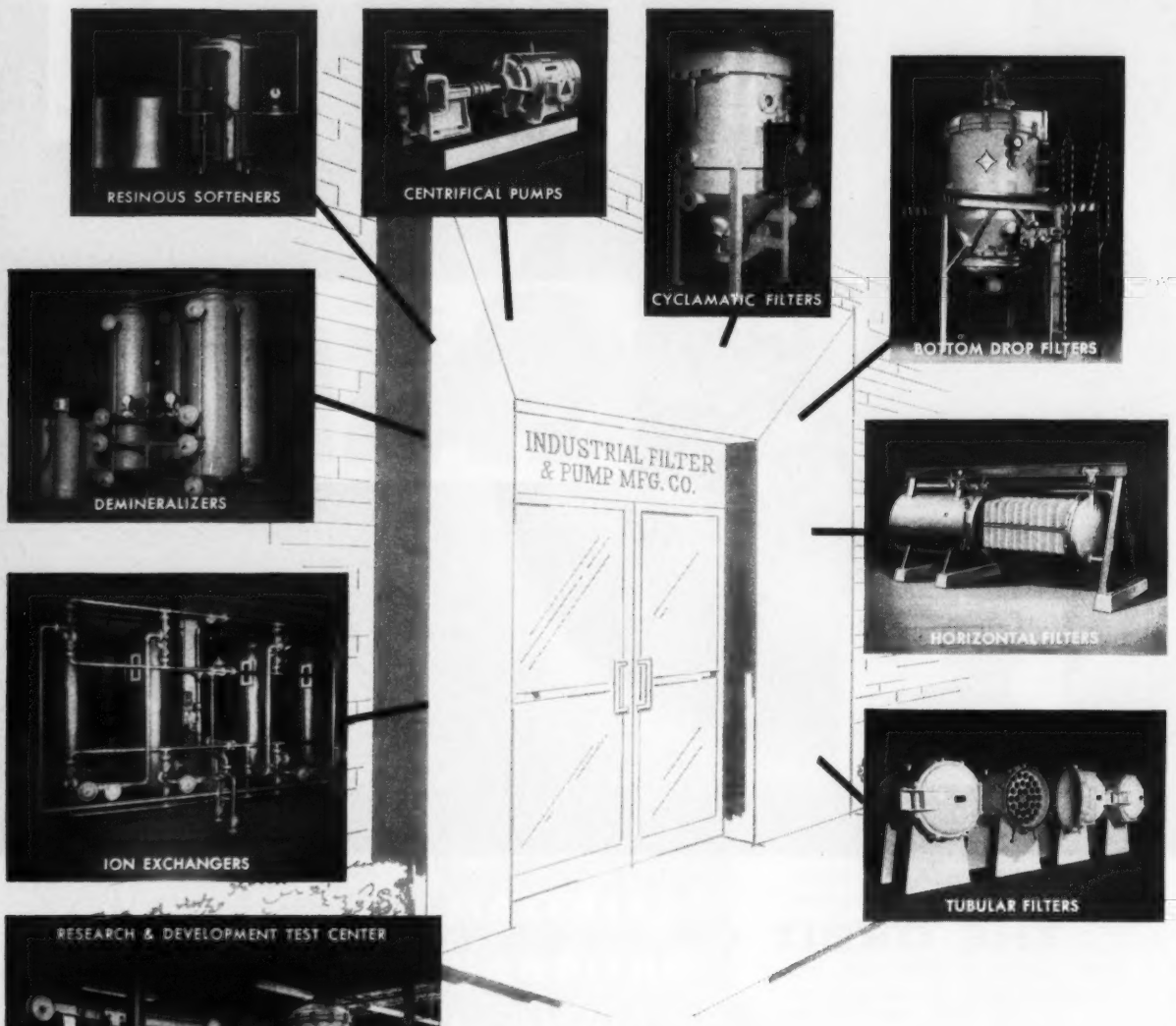
SPAN THE GLOBE

Pulverizing Machinery Division • Metals Disintegrating Company, Inc.
60 Chatham Road • Summit, New Jersey

REPRESENTATIVES throughout the United States, Continental Europe, British Isles, Canada, Mexico, Central and South America, West Indies, South Africa, India, Japan, Philippines, Australia and New Zealand.
MANUFACTURING FACILITIES: United States, Canada, Continental Europe, British Isles.

INDUSTRIAL ENGINEERED EQUIPMENT

for liquid Clarification · Recovery · Treatment



COMPATABILITY of the filtering equipment with the filtering job is the reason why operators rely on *Industrial* for low-cost destruction of toxic waste, or for clarification, recovery or treatment within the system.

Why not investigate Industrial's *Engineering Survey Service?* . . . for a thorough appraisal of your needs by qualified chemists and engineers. Write for details and . . .

See our advertisement PP1263—1268 in the 1958-59 *Chemical Engineering Catalog.*

INDUSTRIAL

C 259

INDUSTRIAL FILTER & PUMP MFG. CO.

5908 Ogden Ave., Cicero 50, ILLINOIS

Check 2895 opposite last page.

Process Dynamics

From page 82

forces of chemical process — aided or impeded by the degree to which transport processes supply or remove energy, and through mixing, provide the transfer of mass. Instantaneous state and rate-of-change information regarding transport processes is optimized (to compare with stored experience-information so as to anticipate what the sequential trend of the process would be if attempts at control were not made, and to then establish basic instructions to a digital control system). This system (a digital computer) would signal various conventional controllers in the plant to make early changes intended to prevent from happening, what would otherwise happen.

All this may be achieved, many feel today, only by acquiring a new kind of knowledge about processes, reaction kinetics, plant and equipment dynamics. An important part of this field is PROCESS DYNAMICS which concerns anticipated or proven performance functions obtained through dynamic testing and theory.

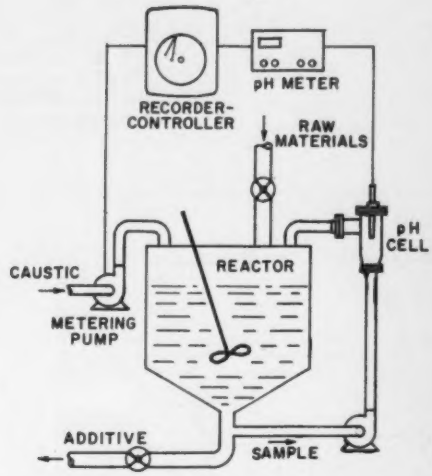
PROCESS DYNAMICS, currently in its early infancy, pertains to the time and manner in which performance of equipment, the process — even the whole plant — reacts to induced or naturally occurring disturbance (or upset).

To many the task of unfolding these new secrets of even simple but highly fluctuating chemical processes appears stupendous. Even the complexity of practically fitting all information entailed into workable patterns, such as in the accompanying figure, almost seems too complicated to be practical. Yet, with other current experience in scientific areas as examples, it is not unreasonable to anticipate great breakthroughs and simplifications.

In ensuing months we will continue this series of further amplification of what PROCESS DYNAMICS is, and what is being done by leaders in the field.

CONTROL SYSTEM KEEPS pH ON STRAIGHT AND NARROW PATH

. . . at Sika Chemical in concrete-densifying-additive batching operations which are unattended at night. Control has been kept to within ± 0.1 pH unit of desired value



In each of two reactors, sampling line and pump circulate representative sample to glass and calomel pH electrode of Beckman pH meter. Signal from electrode is amplified and fed to recorder-controller at nearby reactor-control station.

Electric control is provided by commutator-type contact assembly which is driven directly by drive unit of recorder-controller. If solution tends toward acidity, contacts make, thus energizing pump. Pump adds caustic soda to batch until pH returns to normal.

Problem: In concrete-densifying-additive batch-reaction processing, at Sika Chemical Corporation in Passaic, New Jersey, reaction conditions dictated necessity of continuously and automatically maintaining pH as closely as possible to 5.8. Close adherence to this value is essential in achieving uniform product quality. This need predicated necessity for continuous automatic system of pH control.

Two reactors are used to handle 2000-gal batches of additive. Processing requires 45 to 48 hours to complete. Accordingly, operations are on 24-hours-per-day basis. Since plant is unattended during nights and checked intermittently on weekends, control system adapted had to be consistently reliable.

Solution: Two recorder-controller units were installed to maintain pH value in both reactors as closely as possible to 5.8. For each reactor, sampling line and pump circulate representative sample to glass and calomel pH electrode of Beckman pH meter. Signal from electrode is amplified by Beckman amplifier and fed to recorder-controller at nearby reactor-control station.

Electric control is provided by Rotax commutator-type contact assembly which is driven directly by drive unit of recorder-controller. These contacts respond to any pH deviation from 5.8 norm. If solution tends toward acidity, contacts make, thus energizing pump. Pump adds caustic soda to batch until pH returns to normal.

Mounted on same panel with recorder-controllers are two filled-system temperature controllers. They maintain solution temperatures in reactors. Panel-mounted accessories include signal lights to indicate that pumps are operating.

Emf-measuring system of recorder-controller is comprised of four principal components—drive unit, range unit, vibrator and amplifier unit. Drive unit consists of solenoid motor to position rotor of variable air capacitor.

Stepless Balancing

Capacitor rotor is attached to cross-arm. Each end of cross-arm is connected to core of a solenoid. Measurement change electrically unbalances measuring circuit. Solenoid circuit is simultaneously unbalanced and solenoid cores exert unbalanced pull on cross-arm. This pull changes degree of intermesh between rotor and stator plates of capacitor, until electrical balance is restored to measuring circuit.

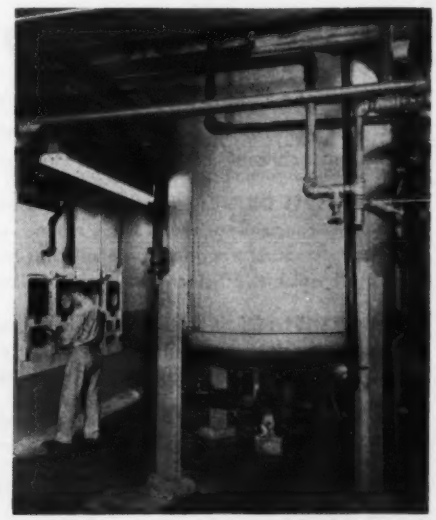
At new balance point, solenoid circuit is in balance. Pull exerted on cross-arm by each core is exactly equal. Pen is linked directly to rotor shaft and continuously records value of measurement. Driveshaft assembly is only moving part in drive unit.

Solenoid cores of drive are practically free from friction. Backlash is eliminated because cores are suspended weights which pull only downward on either end of cross-arm.

Functionally, amplifier unit replaces galvonometer used in conventional potentiometers. It magnifies unbalanced voltage from measuring circuit. Amplifier also provides power to actuate rebalancing mechanism. There are no moving parts.

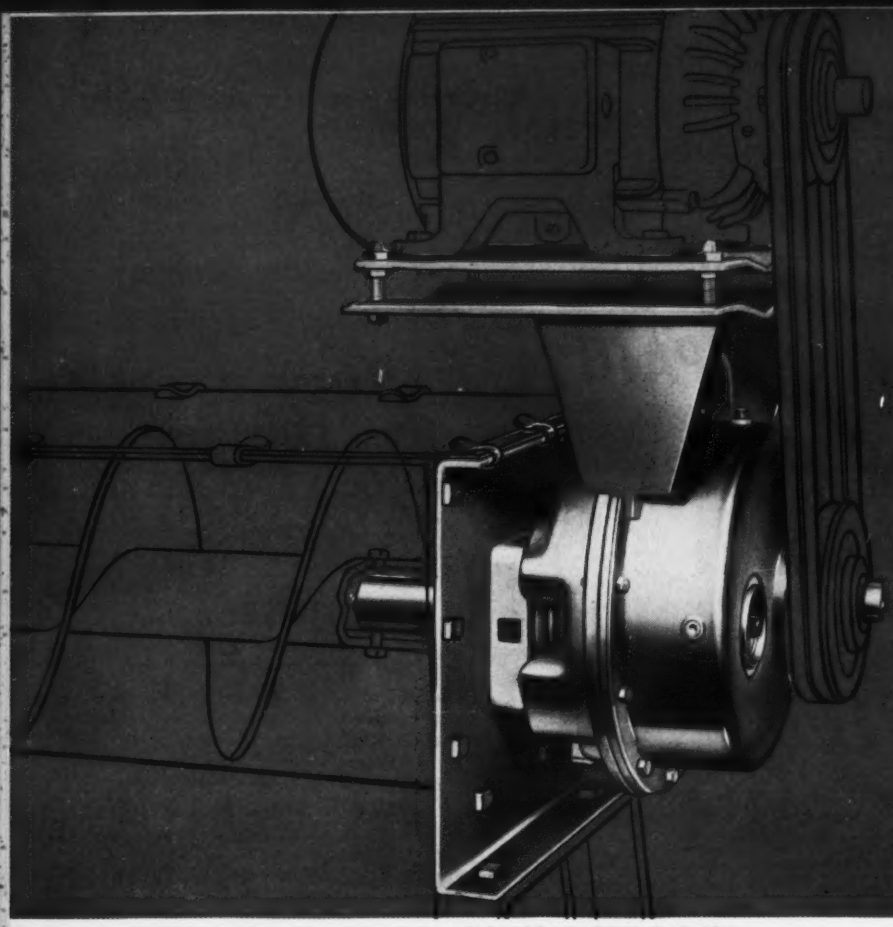
In order to use inherent stability of an AC amplifier, recorder-controller incorporates a vibrator. This converts DC voltage from measuring element and standard cell into AC voltage necessary for operation of measuring circuit and for amplification.

To page 87



Two of these reactors are utilized in batch processing of a concrete-densifying additive. Maintenance of pH as closely as possible to value of 5.8 is critical in achieving high product quality

In three years of operation only one tube has needed replacement. This high reliability of control system permits leaving it unattended at night, with only occasional checking required on weekends



NEW! FALK Screw Conveyor Drive

U.S. and Foreign Patents Applied For

—the drive our customers asked for

Our customers helped us design this new unit. We sent our men into the field to find out what our customers needed in a screw conveyor drive—then our engineers designed a new drive that offers the maximum of service, versatility, operating economy and long life. Here are some of its outstanding features:

A COMPLETE DRIVE: Saves engineering and assembly time. Six sizes to cover entire range—each with these ratios: — 4:1, 9:1, 14:1 and 24:1. Bolts to any standard trough end—eliminates trough end bearing. Eliminates drive shaft wobble. Efficient FALK single helical gears.

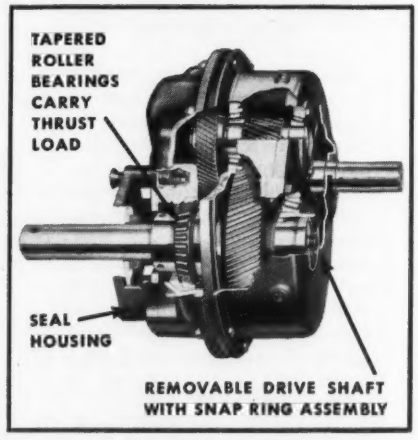
SEAL HOUSINGS: Choice of seals (neoprene or leather lip, felt or waste) to accommodate material conveyed. Space between trough seal and unit seal prevents conveyed material from reaching unit seal.

REMOVABLE DRIVE SHAFT: Snap ring assembly permits easy removal. Five sizes, from 1½" to 3⅞".

TROUGH END: Can be fastened to any standard trough. Eight sizes, from 6" to 20".

ALL-STEEL MOTOR MOUNT: Saves costly engineering and installation time and costs; no motor plates to design or fabricate. Motor can be mounted in virtually any position. Pre-drilled to accommodate NEMA standard motors ½ to 30 HP.

AN IMPORTANT ECONOMY: Buy only what you need—the basic reducer alone, or with trough end and/or motor mount. For detailed information, contact your Falk Representative or Distributor—or ***write direct for Bulletin 7106.***



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LOST YOUR SLIDE RULE?

Then CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations. Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 59.

For more information on product at left, specify 2896 see information request blank opposite last page.

Controls pH

From page 85

Range unit contains range capacitor. Each half-cycle, range capacitor is charged to the potential of measurement voltage, and balancing capacitor is charged to potential of standard cell. Circuit is such that capacitor charges are compared electrically. Any difference in charges produces an unbalance voltage or error signal.

This unbalance voltage is amplified and directed to drive unit which automatically readjusts balancing capacitor until charges on both capacitors are equal.

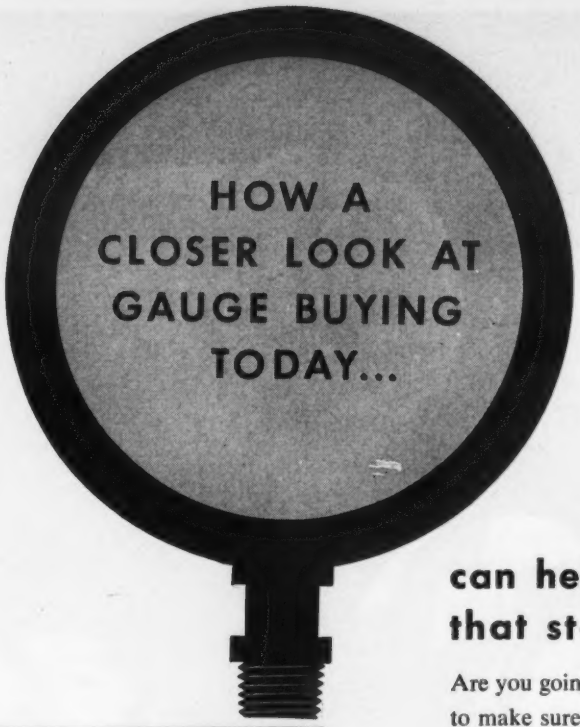
Results: Variation of pH has been held to within ±0.1 unit of 5.8 norm. In three years of operation, only one tube has needed replacement. High degree of reliability of control system permits leaving it unattended in evenings and on weekends.

Two men are assigned to process operation, but their main duty is to start new batches. Without such a system it is estimated that at least six men (two men per shift, on 24-hours-per-day basis) would have been required.

(Recorder-controllers are product of The Foxboro Company, Foxboro, Mass.)

Check 2897 opposite last page.

" . . . and then I heard this tremendous burp . . ."



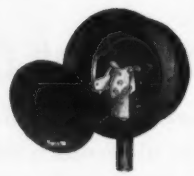
can help you pick gauges that stay on the job

Are you going to a higher price on gauges in order to make sure of gauge reliability? "Over-gauging" to get long life? It will pay to take a closer look at the size, flexibility, and high standards of accuracy of the United States Gauge line. At USG you can choose from over 50,000 standard indicating dial pressure gauges. Thousands of choices in case styles, sizes, materials, and in gauge components. Thousands of specials, too! Not only can you pinpoint your *reliability factor,* you can pinpoint your *price* for 99% of your gauge needs . . . from one line! It's easy to check . . . just call your USG distributor for your next gauge requirement. See the Yellow Pages, or write for catalogs and name of your distributor.

PICK exact Bourdon tube to meet stress, over-pressure, pressure range.

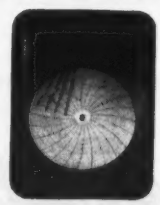
PICK Ni-Span "C" low pressure elements for exceptional thermal stability.

PICK Supergauge® for long life, accuracy to 0.5%.



PICK Solfrunt® for accuracy to 0.5%, solid-front safety from blow-outs.

PICK Test Gauges for dependability, and accuracy as high as 0.2 of 1%.



PICK Recorders and Recording Controllers built to stand vibration, pulsation.

PICK A-Line for premium reliability, accuracy to 1%, and savings up to 40%.

PICK Arc-Loc® Movement for longer life, easier and lower maintenance.

PICK U. S. Gauge Indicating Controllers or Transmitters for reliability.

USG **UNITED STATES GAUGE**

Division of American Machine & Metals, Inc., Sellersville, Pa.

Find Your Nearest Distributor in the "Yellow Pages"

Check 2898 opposite last page.

Logs 14-channels performance data on magnetic tape

Uses: For data logging of up to 14 channels of instantaneous changes in variables. Can be used for high-frequency recording, low-frequency data, transient phenomena, and quasi-static measurements.

Features: Variety of data can be recorded concurrently with common time base. Interpretation is aided by magnetic storage for machine analysis. Six speeds are available with unit magazine loading, completely transistorized. Provides laboratory precision in a portable cabinet.

Description: Unit measures 16½ x 25½ x 14 inches, weighs 100 lb. Completely portable, unit is designed to replace large rack mounted installations.

Printed circuit boards are used to allow interchange of any number of direct or FM channels up to 14.

(Model PS-214 recorder/reproducer is product of Precision Instrument Company, San Carlos, Calif.)

Check 2900 opposite last page.

Senses temperature by monitoring radiation

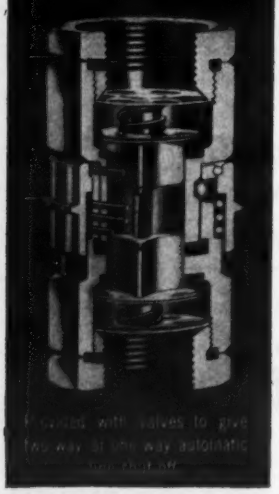
Uses: Continuously measures temperature of remote stationary or moving objects without physical contact. Can be used up to 15 ft from an object having a minimum dimension of only three inches.

Features: Viewed surface cannot be contaminated, damaged, or influenced in any way by measurement. Lowest standard full-scale range is 180-400°F; highest 700-2000°F. Full-scale response obtained in two seconds.

Operates continuously with only occasional cleaning of window.

Built in calibration permits standardization in seconds without interruption of operation. Unaffected by ambient variations from 20-120°F.

Description: Optical system



Built to handle high pressure hydraulic and pneumatic systems

Snap-Tite *valved* couplings stop flow instantly"

Snap-Tite provides instant shut-off wherever fluid coupling is needed.

Snap-Tite *valved* couplings connect and disconnect quickly and fully—they automatically open line flow when connected; positively seal your line when disconnected—with no "ifs," no chance for human error.

Snap-Tite couplings are available in sizes from ¼" to 6" ID, in steel, brass, aluminum, 303 ss and 316 ss. Sizes from 6" to 10" ID are available on special order. For more information, write for Snap-Tite catalog #58. Snap-Tite representatives are located in all principal cities.

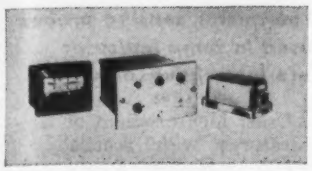
SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS

★ Snap-Tite

87-SD-01

SNAP-TITE, INC. • UNION CITY 6, PA.

Check 2899 opposite last page.



Rack-mounting indicating controller, independent power supply, and optical head comprise radiation thermometer assembly

employing infrared transmitting lens to focus radiation onto detector which generates signal voltage proportional to radiation intensity. Signal is amplified sufficiently to drive indicator calibrated directly in temperature.

Complete unit consists of optical head, power supply, and indicating proportioning controller with SPDT output.

Radiation sensing element is hermetically sealed. Optical assembly is housed in sturdy, dust-tight casting, is said to be insensitive to vibration and shock.

Built-in sighting device permits simple and accurate alignment.

Available in six standard temperature ranges. Special ranges available.

(Thermodot radiation thermometer Model TD-3 is product of Radiation Electronics Co., 8247 N. Kimball Avenue, Skokie, Ill.)

Check 2901 opposite last page.

Controls tank level two miles away

Uses: For controlling and recording level of storage tanks.

Features: Unit employs several detectors to allow operator to determine level of solids at various stages of loading or withdrawal of solids from storage. Radiation detector is unique new type with useful range of 1-1 million. Level of tanks as far off as two miles can be measured and controlled.

Description: Each probe is moisture sealed and shock proof. Each contains a completely transistorized minature ratemeter, the output of which is displayed on a meter located remotely. A single control and power unit supplies up to ten probes. Multi-point recorder is available.

Temperature stability is from 0° to 175°F. Response is fast, less than two second time constant. Gaging system uses low-cost non-shielded cable. All units are interchangeable.

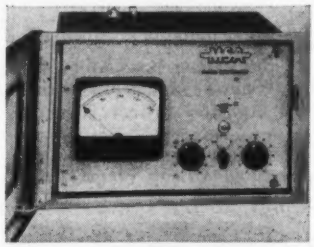
(Multi-channel gaging system is product of Tracerlab Industrial Division, Tracerlab Keleket, Waltham, Mass.)

Check 2902 opposite last page.

Continuous refractometer features flexibility and speed

Uses: Analysis of process stream or batches, for product quality control.

Features: Wide range flexibility, easy conversion to new problems, rapid response. Range measurement as narrow as 0 to 1%, as broad as 0 to 100%. Suppressed-zero ranges can be handled with accuracy of one percent within extremely narrow limits.



Process refractometer features easy resetting of ranges

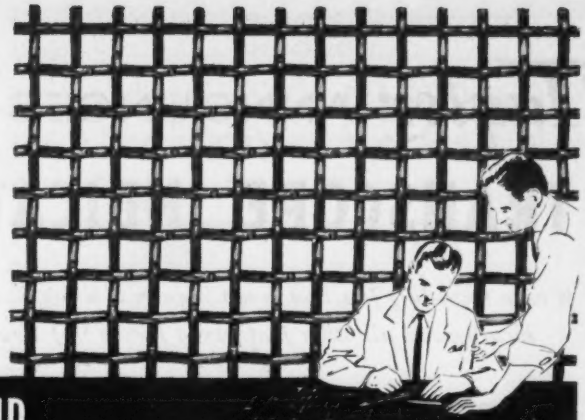
Readings of 90% of full-scale deflection can be obtained within 30 to 60 seconds.

Description: Employs principle of measurement of variations in refractive indices between substance analyzed and a constant standard. Construction features unitized design of amplifier, optical bench, and control unit. Available in explosion-proof or non-explosion-proof, vapor-tight cases.

(MSA process refractometer is product of Mine Safety Appliances Co., Pittsburgh, Pa.)

Check 2903 opposite last page.

Filtration • Straining • Screening • Catalysts



CLEVELAND
Has the Answer to All Wire Cloth Problems

● Whether your problem is bulk or fabricated parts, filtering, straining, screening or catalyst, get in touch with Cleveland. Over 40 years experience in the weaving and fabrication of industrial wire cloth provides the answers to your screen problems.

Immediate shipment of many standard meshes or weaves from stock. Fabrication into products is our engineering specialty.

SEE OUR AD IN CEC

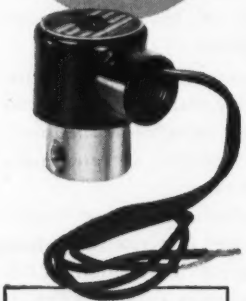
Send your specifications or call today. We'll be glad to consult with you on your wire cloth problems without delay. Ask for Bulletin No. 10.

THE CLEVELAND WIRE CLOTH & MFG. CO.
3577 EAST 78th STREET, CLEVELAND 5, OHIO • DI 1-1833

Check 2904 opposite last page.

New...from MARSH!

MARSH Master-mite SOLENOID VALVES



Conduit-type Master-mite. Grommet-type also available.

Small Solenoid Valves that fill a BIG Order

Designed to meet the need for positive-acting tight-seating valves for use on wide variety of media, including oxygen, hydrogen, acetylene, etc.

Two Types:
Conduit type and grommet type. Port sizes 1/8" and 1/4" NPT.

Ten orifice sizes: 3/64" through 1/4".

Wide range of voltages:
Standard with 115 V. A. C. but also available in 12, 24, 208, 230, 460 V. A. C.

Pressure to 540 psi.
Small, but with more strength in the Marsh manner. Coils never overheat. Entire assembly leak tight. Remarkably quiet operation. Cleanable without breaking connections. Used in any position. Bodies either brass bar stock or 18-8 stainless steel. All moving parts stainless. Underwriters' approved for use on oxygen and hydrogen and as safety valves.

Write for new bulletin

MARSH INSTRUMENT COMPANY
Dept. Z, Skokie, Illinois
Division of Colorado Oil and Gas Corporation
Marsh Instrument & Valve Co., (Canada) Ltd., 8407 103rd St., Edmonton, Alberta, Canada. Houston Branch Plant, 1121 Rothwell St., Sect. 15, Houston, Texas.

Check 2905 opposite last page.

Taylor ANNOUNCES THE TRANSCOPE* INDICATOR

Where recording function is not required, the 90K Indicator incorporates all other features of famed 90J Recorder.

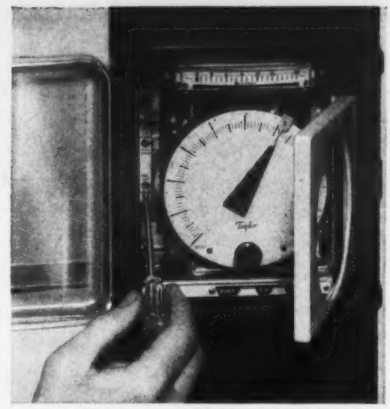
The new 90K Series pneumatic Dial Indicator brings you TRANSCOPE efficiency . . . with the initial economy of process variable indication only. It can be quickly interchanged with the TRANSCOPE Recorder, thanks to plug-in connections. 90K features include:

- Color-coded target-type pointers against full 10" scale—for exceptionally easy reading.
- Powerful "Servomatic" powered pointers—assure precisely accurate pointer positioning.
- Front-of-panel control response settings give results at a glance.
- Same standardized components as in the 90J Recorder—minimum parts inventory necessary.
- In a control station, continuous indication of set, process and valve pressure.

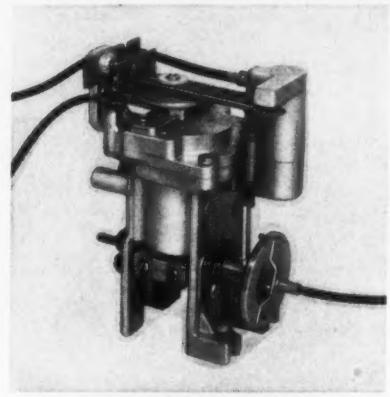
Optional features include: indication of a second variable on a separate dial; Cascade switch for pneumatic set control; electric or pneumatic process alarms.

For full details, call your Taylor Field Engineer, or write for **Catalog 98347.** Taylor Instrument Companies, Rochester 1, New York, or Toronto, Ontario.

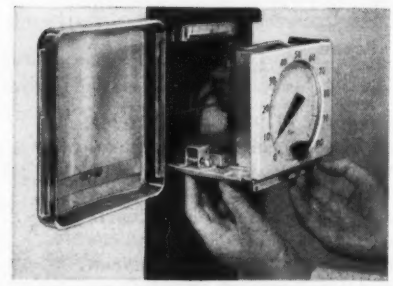
*Reg. U.S. Pat. Off.



Front of Panel Adjustments. Gain, Reset and Pre-Act* response adjustments can be changed where you see the results while making the change.



Servo-operated Pointers are positioned with 150 times greater power than with conventional bellows, which also permits one or two high-low process alarms—electric or pneumatic.



PLUG-IN Connections. The main slide, including indicator and set point transmitting mechanism, is removed by loosening one holding screw.

Taylor Instruments **MEAN ACCURACY FIRST**

Check 2906 opposite last page.

Thermistor sensing probes used in temp indicator are interchangeable

Uses: Measurement of temperatures with accuracy of 0.5° F under 100° F, and 0.5% of reading over 100° F. Device is available in 9 ranges covering −30 to 350° F.

Features: Large scale having excellent linearity aids operator. Interchangeable thermistor sensing probes permit batteries used to give up to 10,000 hours life.

Description: Portable, plastic-cased unit with handle has leader on front. Sensing probe plugs into jack. May be used with channel selector unit for checking ten temperature points.

(Model 116 portable temperature indicator is a product of Fenwal Electronics, Inc., Mellen Street, Framingham, Massachusetts.)

Check 2907 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Lengthens gage life by dampening vibration

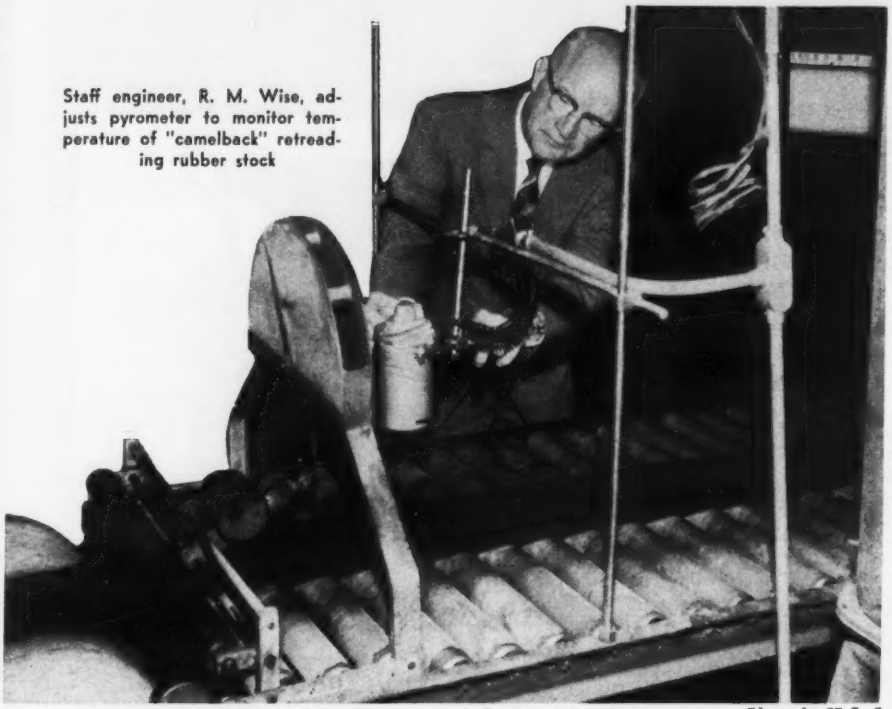
Uses: Effectively isolates gages weighing up to two lb from pulsating gases.

Features: Unit can be used with bottom-inlet gages, with any gas or fluid that does not attack carbon steel. It is especially applicable for use on reciprocating compressors.

Description: Rubber damper isolates pressure gage from piping system or compressor, avoiding rigid connection. Fluid pressure is transmitted to gage through small-bore, stainless steel, spiral-wound tube which absorbs pulsations.

(Stedy-Mount Gage Dampener is product of Vilter Manufacturing Company, Milwaukee 7, Wisconsin.)

Check 2908 opposite last page.

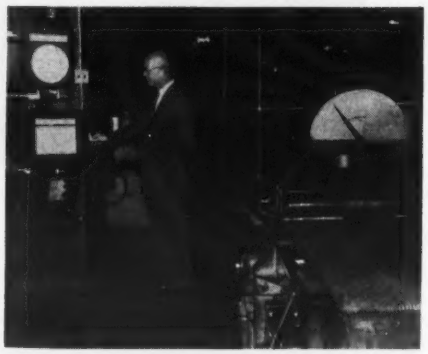


Staff engineer, R. M. Wise, adjusts pyrometer to monitor temperature of "camelback" retreading rubber stock

Photos by CP Staff

Elastomer quality-control record assured by low-range radiation pyrometer

Instrument continuously monitors production to aid in preventing overheating and consequent reduced shelf life



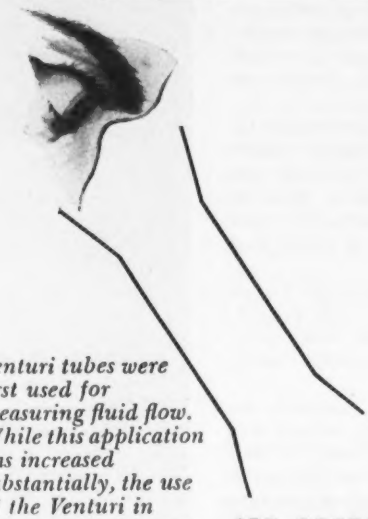
Permanent, continuous strip-chart record is made of each batch temperature for later correlation with field service experience

R. M. WISE, Staff Engineer
Armstrong-Norwalk Rubber Company
West Haven, Connecticut
with **CP STAFF**

Problem: Rubber retread stock (camelback) must have shelf life of up to 12 months, because of variety of sizes which must be stocked by recapper. Overheating during manufacture can seriously reduce shelf life in terms of satisfactory vulcanized bond with tire carcass. Accurate temperature measurement of rapidly moving retread-rubber stock strip has been difficult to achieve.

At Armstrong-Norwalk Rubber Co., Norwalk, Conn., strip temperature was

ENGINEERING PERSPECTIVE
THROUGH A
VENTURI



Venturi tubes were first used for measuring fluid flow. While this application has increased substantially, the use of the Venturi in important unit process operations has increased even more. A Jet-Venturi combination is literally the heart of many important manufacturing processes.

JET REFRIGERATION
JET COMPRESSORS
JET CONDENSERS
JET HEATERS
JET PUMPS
JET MIXERS
JET REACTORS
JET ABSORBERS
JET FUME SCRUBBERS
SPECIAL JET VENTURI UNITS

During the first several years of the forty-two year history of our firm, we specialized entirely on steam jet vacuum pumps (ejectors). Many thousands of these are in service throughout the country and in most foreign countries. Our tradename, EVACTOR, is an important word in engineering circles. While steam jet vacuum pumps are still our major item, other applications of Jet-Venturi equipment are increasing constantly. With the exception of closely related products such as barometric condensers, CHILL-VACTORS, and CONVACTOR* systems, all of our activity is directed to the one purpose of making Jet-Venturi units more efficient, more dependable, more economical, and to apply them to an increasing number of industrial applications.

* The CONVACTOR is a dual condensing system for economic and efficient recovery of high boiling components from water vapor.

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Chill-VACTORS® • Steam-Jet EVACTORS® • Aqua-VACTORS® • Fume Scrubbers • Special Jet Apparatus

Check 2909 opposite last page.

taken as it left meatgrinder-like extruder in manufacturing process. Conventional method required periodic insertion of thermocouple needle into strip, taking a very quick voltage reading, translating this into °F.

This method was limited by strip velocity which ranges from 75 to 5′ minimum, dependent on size. Also, it provided no continuous temperature record of production lot.

Solution: Low-range radiation pyrometer (with recorder) was installed near point where retread strip leaves extruder.

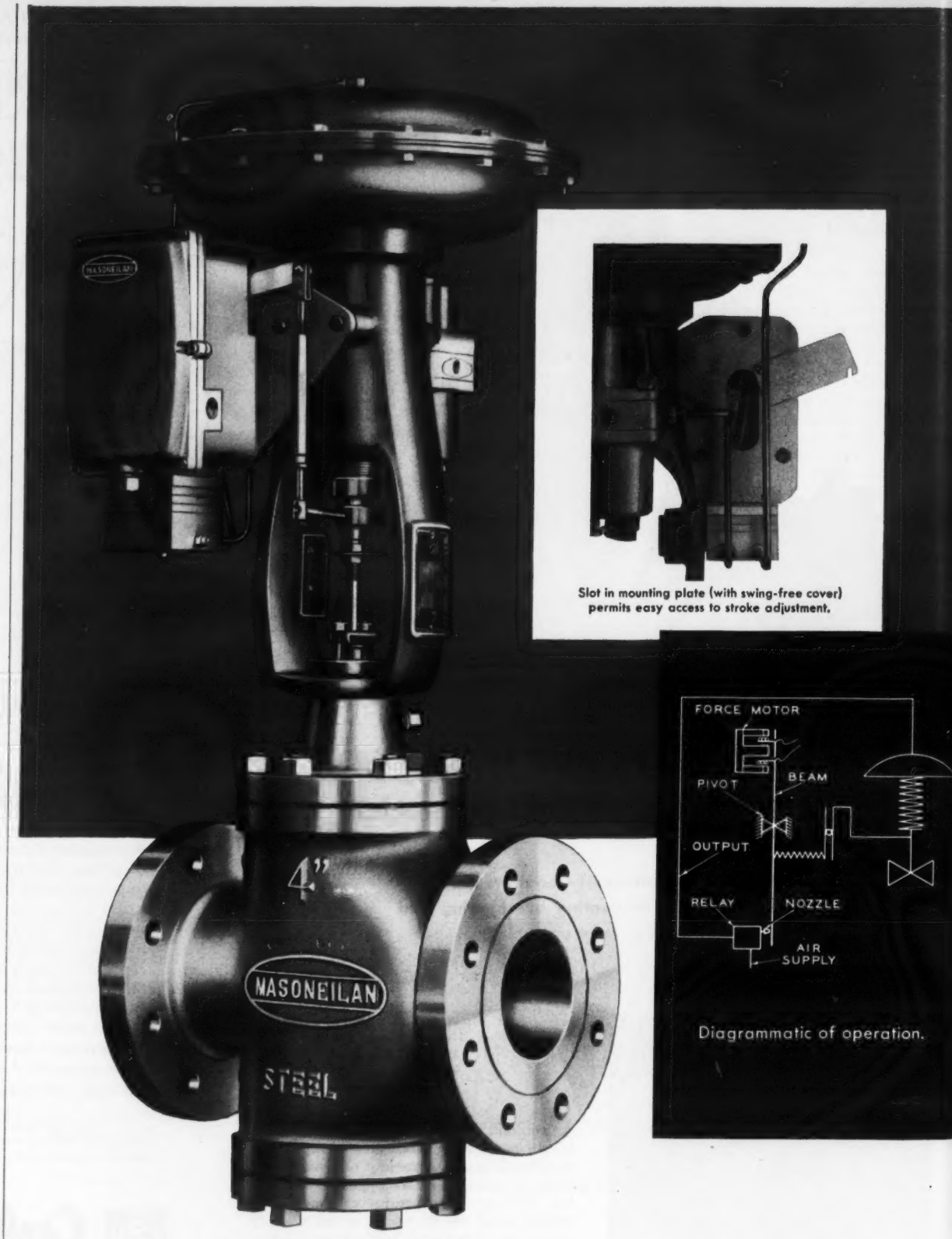
Pyrometer is mounted directly over strip, collects and concentrates (by concave mirror) broad wave-length emission onto sensitive thermopile. Linear millivolt signal (0°F = −.02 mv; 400°F = 22 mv) is produced. This signal actuates recorder to produce a continuous strip chart. Chart is filed with other data pertaining to lot for possible retrieval and correlation with field service experience.

Results: Quality control record is assured. System provides additional alert to operator if temperature rises to undesirable level. Operator compensates by varying speed of extrusion or rate of flow of cooling water to jackets.

Installation is stable, as shown by repeated checks against thermocouple, and by recalibrations. Accuracy is unaffected by wide variations in strip velocity.

(Model 9E6 Velotron low-range radiation pyrometer system with strip-chart recorder is available from The Bristol Company, Waterbury, Connecticut.)

Check 2910 opposite last page.



Model 8010 mounted on spring-diaphragm actuator. Note compact design.

Slot in mounting plate (with swing-free cover) permits easy access to stroke adjustment.

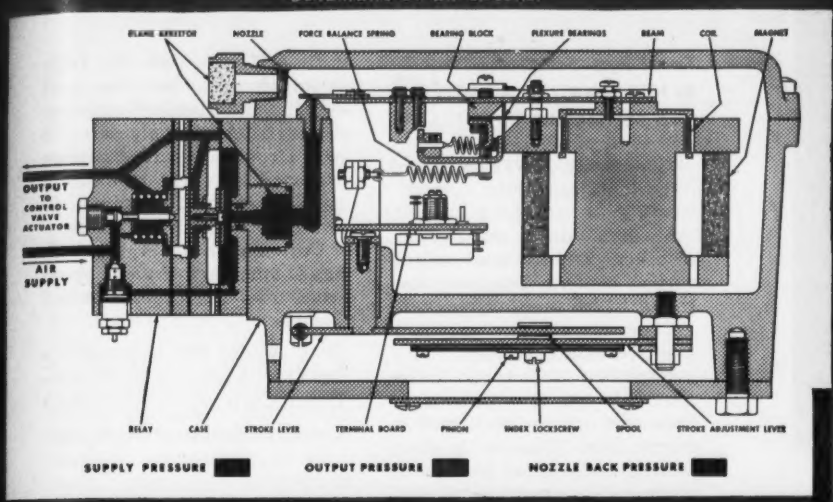
Diagrammatic of operation.

Monitors 100 temp simultaneously

Uses: Alarm and panel light indicate temperature at sensing point reaching predetermined level.

Features: Unit made up of 10 point panels. Time lag encountered in scanning type systems is eliminated. Up to

Schematic of air circuits.



Speed

ACTUATOR SIZE	VALVE STROKE (inches)	SPEED (seconds)
9	½	1.5
	¾	1.8
11	¾	2.6
	1	3.3
13	1	4.3
	1½	6.3
15	1½	9.4
	2	11.4
18	2½	21
	3½	28
	4	32

Performance Data

Open-loop Gain* — approximately 100
Linearity — within ±1% of full stroke
Repeatability — within 0.2%
Load Sensitivity — Output pressure change of 1.2 psi per 0.1% of full stroke offset
Supply Pressure Effect — ±1% of full stroke for ±5 psi change from 20 psi

Now! Masoneilan E/P Positioner with Stem Velocity Feedback

Combines high open-loop gain and closed-loop stability to give you Precise Positioning and Superior Dynamic Response

The new Masoneilan Model 8010 Electropneumatic Positioner offers optimum performance plus these design advantages:

- A true positioner — *direct* comparison of valve stem position with controller output signal provides dynamic response and positioning accuracy not obtainable with transducer and pneumatic positioner combination.
- Electrical circuit easily adapted to a variety of controller output signals.
- Extra large stabilized magnet, plus efficient magnetic circuit, provides high force changes.
- Explosion-proof construction meets requirements of Class I, Division I, Group D.
- External stroke adjustment accessible without removal of cover — no exposure of electric wiring.
- High capacity relay for fast stroking speeds. Relay may be mounted in any one of four positions to facilitate piping.
- Balanced beam permits installation of valve in any position without shift in calibration.
- Available for 3-15 psi or 6-30 psi valve spring ranges and for split-ranging. Standard stroke ranges ⅜"–3" and 2"–4". Others available.
- Available with direct or reverse action and for direct or reverse actuators.

You can now utilize the desirable characteristics of electronic control and obtain the power and smooth throttling action of pneumatic valves by using Masoneilan Model 8010 E/P Positioners. Full details on request. Ask a Mason-Neilan representative or write direct —

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8010-43

Check 2911 opposite last page.

100 temperatures can be monitored at the same time.

Description: Construction is of standard relay rack type. Interchangeable printed circuit cards are used throughout. With no moving parts and no vacuum tubes, unit is completely transistorized. Small writing area adjacent to each dial enables operator to record temperature setting. Temperature accuracy is ±3°F.

(Simultaneous Temperature Alarm Readout is product of Fischer & Porter Company, Hatboro, Pennsylvania.)

Check 2912 opposite last page.

Proportions fixed ratios of liquid feedstreams at variable output

Uses: Accurate multi-liquid blending for semi-batch and complete automatic processing.

Features: Each pump in multi-head assembly is adjusted manually to establish feed ratio. Over-all output is changed from remote panel board by changing air signal to variable speed drive.

Description: Pumps are of positive displacement type. Reciprocating piston within pump forces oil to move diaphragm forward and to return. Backstroke takes liquid chemical into reagent head through suction check valves. Liquid is forced through discharge valves on forward stroke. Diaphragm isolates chemical being pumped. Only reagent head plate, check valves, and diaphragm need to made of corrosion-resistant material.

(Pulsafeeder Pump Model CP Q-3-3-2-1-1 available from Lapp Insulator Co., Process Equipment Div., LeRoy, New York.)

Check 2913 opposite last page.

Ventilation controllers, including control applications, cycles of operation, damper sequence charts, specifications for precise temperature control and installation data, are reviewed in 86-page Application Manual — Barber-Colman Company.

Check 2914 opposite last page.

Ruggles-Coles

ROTARY COOLERS IN FOUR TYPES

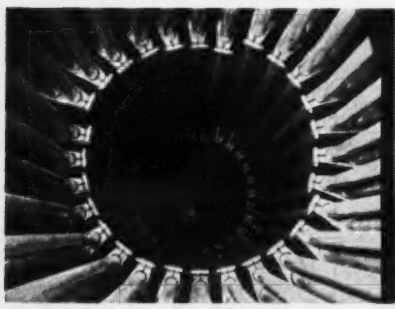
GAS-COOLED TYPE—Solids are cooled by direct contact with cooling air (atmospheric, or dried and refrigerated). Inert gases may be used in a closed system.

WATER-COOLED SHELL—Water is externally applied to the shell, either by sprays or by partially submerging the shell.

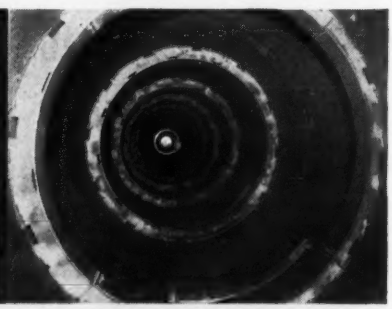
TUBULAR TYPE—Internal water-cooling tubes are assembled with the rotating shell, or installed as a stationary bank of tubes concentric with the shell. Alternately, the water leaving either of these tube sections may be used for supplemental spray cooling on the shell exterior.

DIRECT-CONTACT WATER—For rapid cooling from very high temperatures, water is sprayed directly on the hot material to utilize the latent heat of vaporization. Usually supplemented by secondary air cooling.

Each of these types has a particular area in which it is most economically applied. Write for further information.



Interior of a water-tube cooler. Longitudinal banks of tubes provide maximum cooling surface for minimum floor space.



Interior of partially-submerged cooler with gravity-controlled scrapers maintaining clean shell surface for high-rate heat transfer.

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Check 2915 opposite last page.

Total hydrocarbons in less than two seconds

Completely self-contained portable unit

Uses: Monitors air, oxygen, or other gases for total hydrocarbon content. Does not distinguish between compounds. Serves equally in lab, field, and processing systems.

Features: Sensitivity better than 0.1 ppm for gaseous or vaporous organic hydrocarbon compounds. Completely free from interference from such common backgrounds as water vapor, O_2, N_2, CO_2, and rare gases.

Range may be adjusted from as low as zero-to-one ppm, to 0-to-10%. Response time is less than two seconds.

Ruggedness permits obtaining identical results after handling unit as baggage.

Maintenance requirements are negligible. Said to be operable by nontechnical personnel after only 30 minutes instruction.

Dangerous hydrocarbon content of air liquifaction can be quickly detected

Description: Vital part is flame ionization detector. Metered flow of sample is fed into a hydrogen flame in enclosed chamber. Flame ionizes combustibles in sample to effect changes in current flow of surrounding electrical field proportional to total carbon content of sample. Results are read on meter, or an attached milliamp or millivolt recorder.

Unit is housed in sturdy suitcase-type enclosure of aluminum measuring 18 x 13 x 8 in. Weight, 47 lb fully equipped with batteries and air, H_2, and standardizing gas cylinders. Air supply lasts 18 hrs, H_2 supply and batteries average 180 hrs, calibrating gases a year. All are of standard types, readily available.

Unit may be operated with hand or motor-driven pump when used with unpressurized samples.

(P-E Model 213 hydrocarbon detector is product of Perkin-Elmer Corp., Norwalk, Conn.)

Check 2916 opposite last page.

Infrared analyzer is portable, flexible

Uses: To solve plant stream or atmospheric control problems where extreme sensitivity or selectivity is not essential.

Features: Unit weighs only 30 lbs and is housed in case 8" high and wide and 19" long. It can be calibrated in very narrow or very broad ranges. Typical ranges include: 0 to 0.2 percent CO or CO_2, 1 to 50 percent relative humidity.

Description: Infrared analyzer is mounted on single tray which may be rolled completely out of case for maintenance or servicing. Unitized construction enables operator to convert rapidly from one analytical problem to another.

(MSA Model 300 Lira is a product of Mine Safety Appliances Co., Braddock, Thomas & Meade St., Pittsburgh, Pennsylvania.)

Check 2917 opposite last page.

Chromatographs in less than one minute

Uses: Process stream analysis, particularly where instrument simplicity in combination with short cycle interval makes it particularly suited to applications involving direct process control by chromatography.

Features: Makes many chromatographic analyses in a fraction of a minute that are

said to require 15 to 30 minutes on conventional instruments. Device is well suited for majority of analyses in percentage ranges where bargraph indication is required for no more than four components.

Entire design of device is to accommodate very small sample sizes, to 0.05 cc. Programming control section is designed for high speed timing as well as for convenience in observation and setting.

Description: Instrument comprises three basic sections; analyzer, control, and strip chart. Analyzer section is housed in explosion-proof fiberglass insulated dome. Panel on base of this section houses operating controls. Sample and carrier gas are handled only in analyzer section, normally in plant area close to sampling point. The control section may be as far as 1500 ft from analyzer section.

Detector system employs specially developed miniature thermistors with low time constant.

(Chroma-matic 555 Process Stream Analyzer is product of Greenbrier Instruments, Inc., Ronceverte, W. Va.)

Check 2918 opposite last page.

"Beverly is going to put up curtains and pretty up the lab for us."

Gage safely indicates accurate pressures to 100,000 psi

Uses: High pressure applications, where gage indication of pressure is required.

Features: Laminated dial glass, multi-turn helical Bourdon tube, and Teflon rupture plate back.

Range adjustments may be made without disturbing element or removing dial glass. Accuracy is ¼ of 1%.

Description: Six-inch-diam gage is available in 12 ranges from 1000 to 100,000 psig. Element is drawn and formed 316 stainless steel. Mechanically sealed ends facilitate cleaning.

To facilitate reading, sealed divisions are spread over 300 deg for all ranges.

Gage is designed to Class AA standards (ASA B40. 1-1939).

(Astragauge is product of Astra Corporation, Hatboro, Pennsylvania.)

Check 2919 opposite last page.

Exterior paint changes color when heated

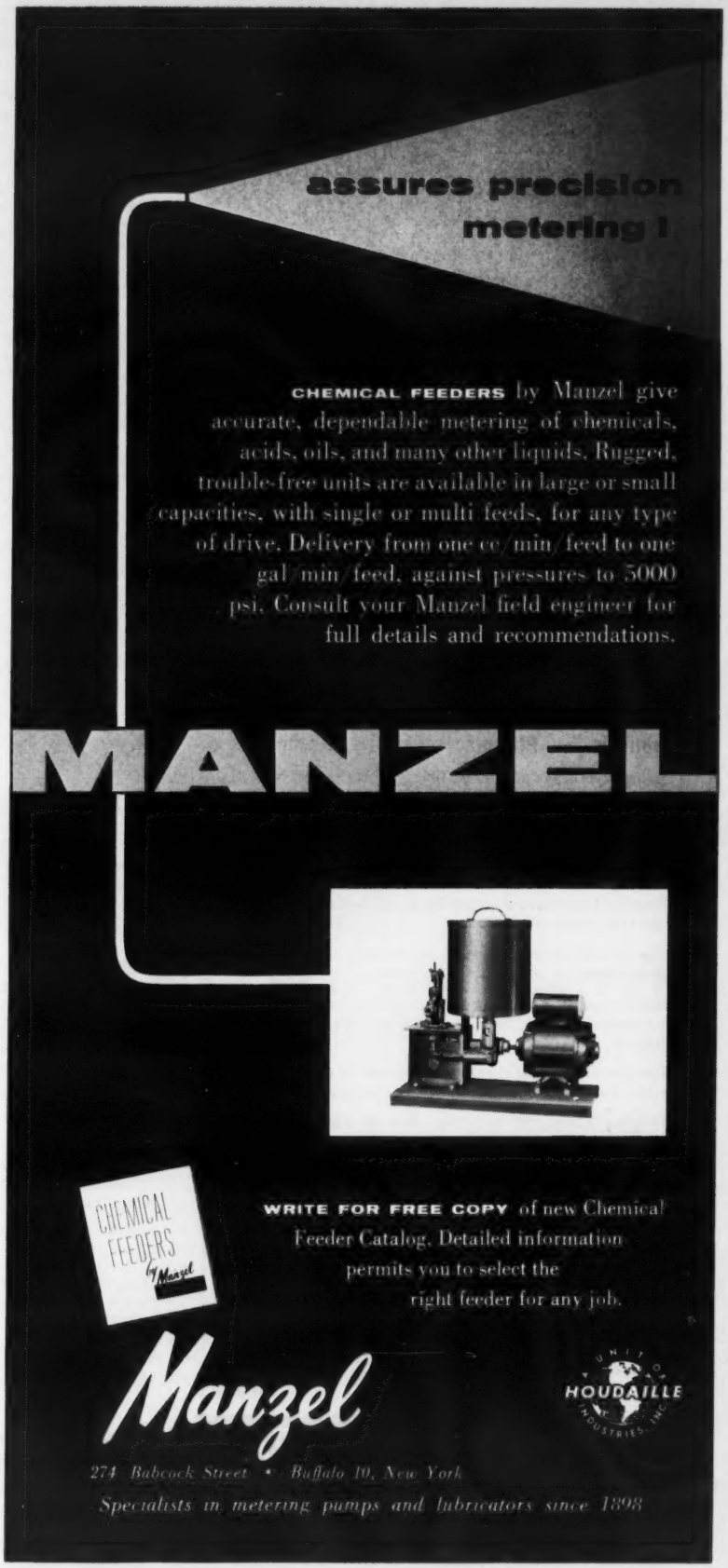
Uses: For exterior and interior application on chemical processing plant and pilot plant equipment. Can be used on surfaces to be welded to show spread and degree of heat adjacent to weld.

Features: Variety of paints undergo from one to four sequential changes of color to indicate surfaces having reached critical temperatures. Most color changes are permanent, said to make temperature observations possible at any time after test or service exposure.

Paints are said to adhere well to all types of surfaces such as metals, glass, insulations, etc.

Temperature range is 104-2912°F.

Description: Paint is supplied in powder form, can be readily mixed with alcohol and applied by brush or spray gun. Paint dries within minutes and may be coated with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CHEMICAL FEEDERS by Manzel give accurate, dependable metering of chemicals, acids, oils, and many other liquids. Rugged, trouble-free units are available in large or small capacities, with single or multi feeds, for any type of drive. Delivery from one cc/min feed to one gal/min feed, against pressures to 5000 psi. Consult your Manzel field engineer for full details and recommendations.
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Check 2920 opposite last page.

lacquer for permanent fixing to exterior surfaces.

Twenty-one paints cover a measurement range of 104-2462°F, providing single color change when specific temperature points are reached. Another group of 15 paints covers range from 131-2912°F, undergoing multiples of two, three, or four color changes at different levels.

When test temperatures are reached after a 20-minute heating period, margin of error is said to be ± 9°F.

(DetectoTemp temperature indicating paints are a product of Princeton Division, Curtiss-Wright Corp., Princeton, New Jersey.)

Check 2922 opposite last page.

NEW LITERATURE
Process Instrumentation and Laboratory Apparatus

Accelerometers are expanded upon in 20-page booklet which includes application information, piezoelectric materials, non-vibration environments, mounting techniques, fixtures, calibration methods and techniques and useful formulae. Accelerometers Manual — Endevco Corporation.

Check 2923 opposite last page.

Self-policing annunciators are presented along with basic engineering data in 36-page Cat 659 — The Scam Instrument Corporation.

Check 2924 opposite last page.

High-temperature ovens are summarized in 22-page Cat C-3 — Modern Laboratory Equipment Co., Inc.

Check 2925 opposite last page.

Hygrometric equipment, ranging from individual componet to complete systems, is described in 69-page Cat 660 — American Instrument Co., Inc.

Check 2926 opposite last page.

Radiation pyrometry, including complete description of theory and fundamentals, is subject of bulletin which also details function, construction and application of detectors. Cat C-93-la — Industrial Division, Minneapolis-Honeywell Regulator Co.

Check 2927 opposite last page.

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TOTELINE FIBER GLASS TRAYS

FOR DRYING—

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Toteline dryer trays of molded fiber glass are stronger than steel, yet they weigh TWO-THIRDS LESS! They outlast and outperform metal trays. American Cyanamid Co. reported annual savings of 50 percent after switching to Toteline Dryer Trays. You too can make substantial savings with Toteline. Here's why . . .

- Toteline Trays have a longer life and a lower replacement rate than metal trays.
- Drying time is reduced because Toteline Trays do not absorb heat.
- Higher quality is maintained because Toteline Trays have no coating to peel, flake or otherwise contaminate your product.
- Toteline Trays resist the corrosive action of non-oxidizing acids, weak alkalis and many other chemicals.
- Toteline Trays will not chip, dent or warp. They are easier and safer to handle.
- You get more plus factors in Toteline than in any metal tray.

For further information and catalog sheets on Toteline chemical drying trays, clip and mail this coupon to us with your company letterhead, furnishing us with your name and title.

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Title_____

MF 9-CP

by TOTELINE

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READ any surface temperature with Alnor® PYROCON

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Compact, complete in precision design, this rugged instrument assures highest standards of speed, accuracy and dependability.

Alnor Portable Pyrocons come in scale ranges to 2000° F., with thermocouples for every application. You'll find full details on the Pyrocon exactly suited to your operations in Bulletin 4257. Send for your copy now. Write: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

Alnor **PRECISION INSTRUMENTS FOR EVERY INDUSTRY**

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- INDUSTRIAL TIMERS
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The Bulletins are technically informative; with load capacities, installation diagrams, etc.

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Check 2929 opposite last page.

Electronic equipment for industry is specially emphasized in 528-page catalog which lists more than 40,000 items. Included are listings of parts and equipment for industrial maintenance, research and production requirements. Catalog may be obtained by writing on company letterhead to Allied Radio Corporation, 100 North Western Ave., Chicago 80, Ill.

Analytical balances are pictured and described in 12-page catalog which features thermo-recording and micro-chemical balances. Cat 90 — Burrell Corporation.

Check 2930 opposite last page.

Temperature controllers, among them fixed contact thermostats, adjustable thermoregulators and magnetic relays, are explained in two-page Bul T-5 — Precision Thermometer & Instrument Co.

Check 2931 opposite last page.

Annunciator systems are given comprehensive treatment in 52-page catalog illustrated with equipment photographs, charts and diagrams. Cat 100C — Panalarm Division of Panellit, Inc.

Check 2932 opposite last page.

Electronic controllers are depicted in bulletin which features illustrated chart on which all major system components are arranged functionally to enable reader to see what control instrumentation is available for a given process variable. Bul A-913 — the Swartwout Co.

Check 2933 opposite last page.

Mass flowmeter is presented with data on ranges, specifications and dimensions, and cutaway drawings in eight-page Bul GEA-6925 — Instrument Department, General Electric Company.

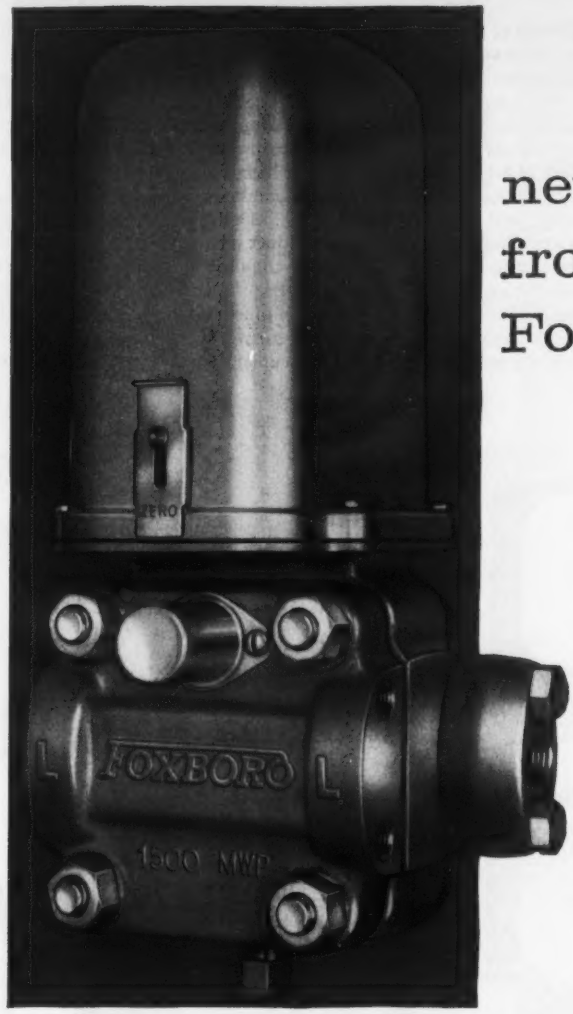
Check 2934 opposite last page.

Analog computer is presented along with technical data and specifications, including special amplifiers and networks available, in two-page Computer CM-2 Bul — Southwestern Industrial Electronics Co., division of Dresser Industries, Inc.

Check 2935 opposite last page.

On-stream instrumentation for process industry measurement and control equipment is covered in 12-page brochure which includes specifications, applications and operating characteristics. Bul No. PI-959—Industrial Nucleonics Corporation.

Check 2936 opposite last page.



new
from
Foxboro

ABSOLUTE PRESSURE d/p CELL TRANSMITTER
with full-power 3-15 psi signal

Now there's a Foxboro d/p Cell designed specifically for low pressure measurement and transmission. It's the new Type 13AA Absolute Pressure Transmitter.

One side of the 13AA is evacuated, providing an absolute zero reference for the measurement of any process pressure. The 3-15 psi output signal has ample power for direct operation of standard receiver recorders and controllers.

This transmitter is simple in construction for trouble-free service. It provides for easy draining, steam tracing, and cleaning by regular maintenance procedures. Type 316 S.S. construction. Positive overrange protection to 1500 psi.

The 13AA Absolute Pressure Transmitter is ideal for use with such process equipment as low pressure fractionating columns, evaporators, and vacuum crystallizers. Ask your Foxboro Field Engineer for detailed information, or write for Bulletin 458-22A. **The Foxboro Company, 811 Neponset Ave., Foxboro, Mass.**

Specifications:

Range Spans: Adjustable 100 to 450 and 400 to 1500 mm of mercury

Output: 3-15 psi or 0.2 — 1.0 kg/cm²

Accuracy: 0.5 percent of full scale span on most ranges

FOXBORO
REG. U.S. PAT. OFF.
process instrumentation

Check 2937 opposite last page.

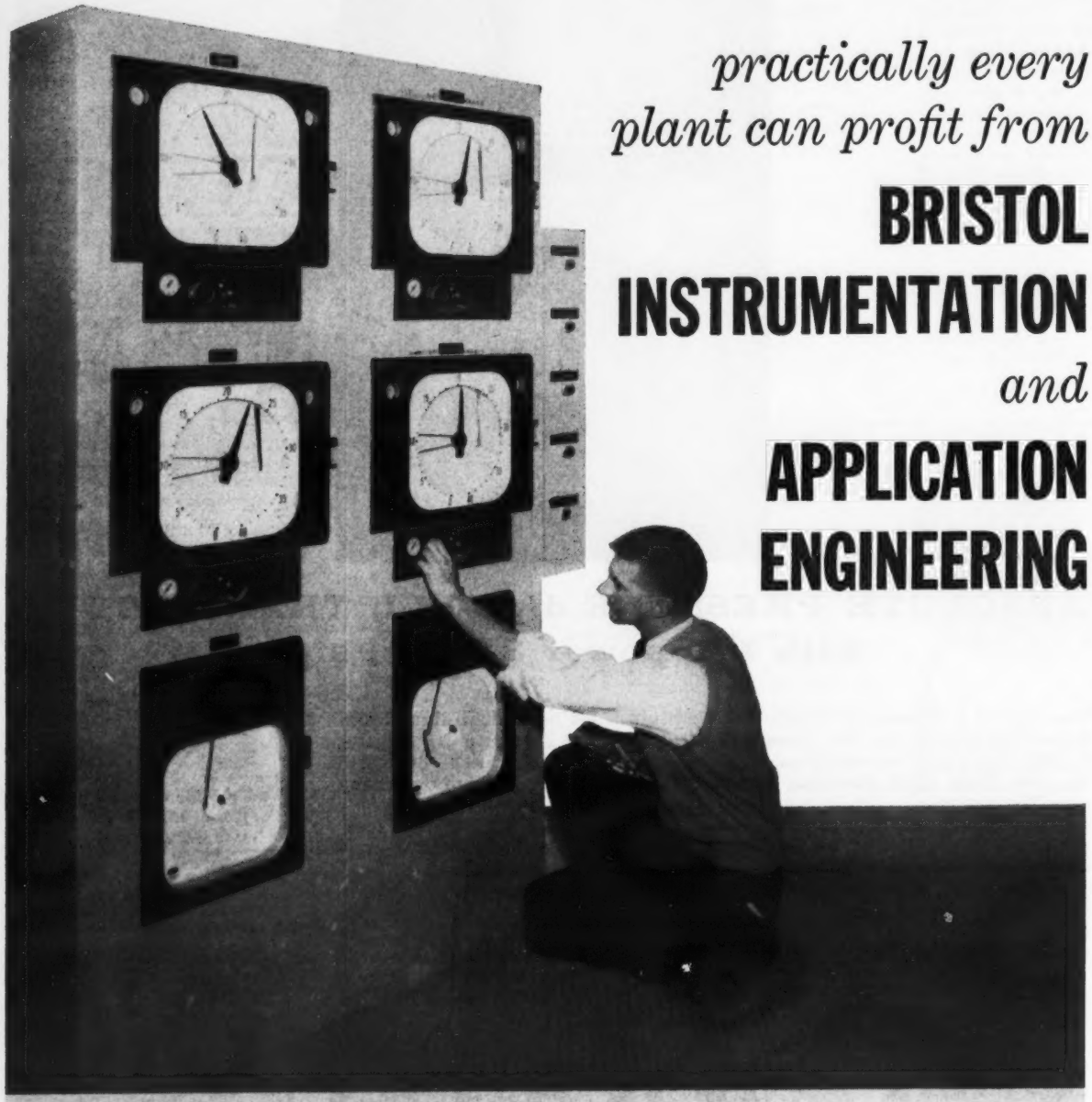
Name your process; Bristol can help you measure, record or automatically control it.

Just one example: Wood Conversion Company's new Riverside, N. J., plant with an all-Bristol process instrument installation, part of which is shown below. Here precise instrument control helps turn out, in a wide variety of forms, Balsam Wool® for housing insulation and Tufflex® used for cushion padding, sound deadening, and protective packaging. Costly human errors are eliminated, improving product uniformity and releasing valuable supervisory time for more important duties.

Whatever your plant or process, Bristol engineers —as at Wood Conversion—are always ready to work with your engineers in setting up a new instrumentation system or in modernizing and improving your existing system.

Temperature, pressure, absolute pressure or vacuum, flow, liquid level, humidity, pH, tension, thickness, speed and mechanical motion are just a few of the variables that can be recorded or exactly controlled.

Bristol makes the most complete line of instruments on the market—full-size, miniature, electronic and pneumatic types—for measurement, recording, automatic control and telemetering. Bristol's wide line insures you of the right instrument for your job, every time, and Bristol engineers are always ready to assist you in selecting it. Write: The Bristol Company, 141 Bristol Road, Waterbury 20, Conn. 9.24



practically every plant can profit from

BRISTOL INSTRUMENTATION *and* **APPLICATION ENGINEERING**

BRISTOL... for improved production through measurement and control

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 2938 opposite last page.

INSTRUMENTS & LAB

Analytical balances for recording weight changes of substances subjected to heat-time cycle in air or controlled atmosphere are delineated in four-page Thermobalance Bul — Cooke, Troughton & Simms, Inc., American Corp. of The Vickers Group.

Check 2939 opposite last page.

Constant-temperature bath which features an all-electronic circuit with no contact breaking, regulating accuracy of ±0.01 to 0.001°C, and fast temperature recovery after loading, is introduced in Bul WB — E. H. Sargent & Co.

Check 2940 opposite last page.

Proportioning pump of the electrically-driven, positive-displacement type, is described in two-page Bul 1210.20-1 — Proportioneers Div., B-I-F Industries, Inc.

Check 2941 opposite last page.

Panel meters and pyrometers for monitoring any electrically measurable variable are cataloged in 12-page Bul 107 — Assembly Products, Inc.

Check 2942 opposite last page.

Carbon dioxide analyzer is discussed in two-page methodology sheet which includes flow diagram, calibration curve, and actual recording. "Carbon Dioxide" — Technicon Controls, Inc.

Check 2943 opposite last page.

Plastic laboratory ware made from materials which run the gamut from acetate to styrene are listed in 32-page Cat No. 959—Bel-Art Products.

Check 2944 opposite last page.

Selecting fume hoods for laboratory applications is topic of 16-page booklet which covers testing methods, operating and safety precautions, and includes glossary of terms. Hood Selection Bul — Kewaunee Manufacturing Company.

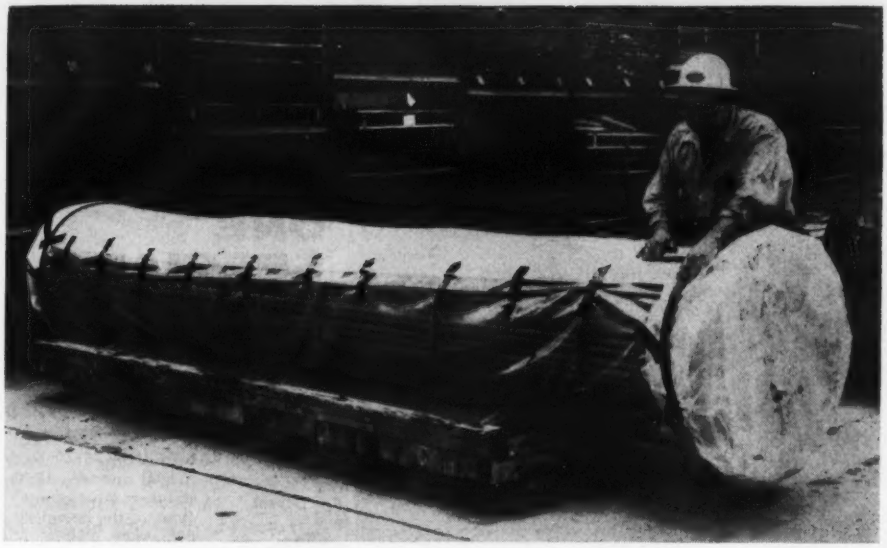
Check 2945 opposite last page.

Electronic multiplier which provides dynamic accuracy of ±0.05% of full scale at 500 cps is described in 16-page brochure available from Computer Systems, Inc. (formerly Mid-Century Instrumatic Corp.).

Check 2946 opposite last page.

Instrumentation and automation systems are described in 16-page brochure which discusses various services furnished for installation and start-up. Bul 107—Panellit Service Corp., div. of Panellit, Inc.

Check 2947 opposite last page.



Polyethylene wrapper protecting tube bundle is sealed airtight

Combination of an anti-rust coating, desiccant and covering of polyethylene film —

Protects heat exchanger bundles at 1/8 previous cost

Problem: Former military-style mothballing method used for protecting heat exchanger bundles from corrosion during storage at Esso Standard Oil Company's Bayway refinery, Linden, N. J., cost about $150 per bundle. Procedure consisted of first wrapping the tube bundles in a gauze-like material, followed by a spray-on coating. If bundles were not protected, they would rust and become useless in a short time.

Refinery has also used just rust-proof coatings, which were effective for a few months. Consideration had been given to dipping such equipment in vats of protective paint. A more economical and effective method of protecting the bundles was sought.

Solution: Refinery adopted a three-step procedure of protecting bundles. To guard against the presence of moisture, a desiccant or drying agent is first placed beneath the tubes. Then they are given a rust-proof coating. Third step is to wrap the bundles in a double thickness of Visqueen polyethylene film. Polyethylene is sealed airtight with a special tape, also made of polyethylene, with a high adhesive tack.

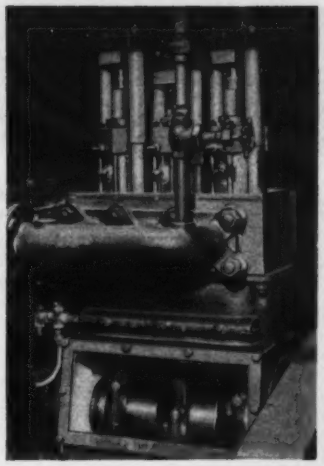
Polyethylene film and tape are inert, having excellent resistance to acids, alkalis and atmospheric conditions. Film is normally available in thicknesses of 4 and 6 mils in widths up to 32′ by 100′ long, in both clear and black. If equipment is to be stored outside, black film will be less affected by ultraviolet light, particularly in the summer.

Results: Whereas previous method cost about $150 for each bundle, polyethylene wrapping costs about $20. Both figures represent cost for labor and materials. In addition to cutting costs, present method provides longer-lasting protection. Speed and ease in handling are other advantages of the polyethylene-wrapping method.

(Visqueen polyethylene film and tape are products of Plastics Div., Visking Company, Div. of Union Carbide Corporation, 6733 West 65th St., Chicago 38, Illinois.)

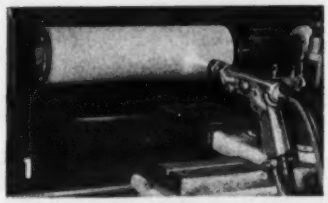
Check 2948 opposite last page.

Colmonoy Protected Plunger Outlasts Other Two in Triplex Pump Test



A Colmonoy hard-surfaced pump plunger was operated along with two other standard plungers in a four-month test by Cardinal Chemical Co. After pumping 748,524 gallons of acid, oil, and various sand-laden fluids, the Colmonoy surfaced plunger showed no signs of wear whatsoever. The two unprotected plungers suffered severe wear, having almost reached the limit of their usefulness. Discover for yourself how Colmonoy hard-surfacing extends equipment life, reduces down-time and maintenance costs.

Applying Colmonoy Sprayweld Hard-Surfacing:*

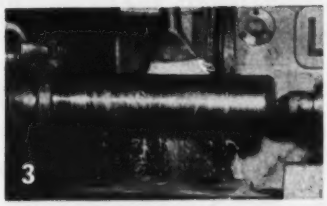


1

Plunger is prepared for spraying by undercutting and grit blasting. The Colmonoy Spraywelder sprays powdered Colmonoy alloy on the turning part.

2

The Colmonoy surface is then heated to about 1900° F. to create a welded bond between overlay and base metal.



3

Sprayweld overlays are smooth and evenly applied, require little finish grinding.

Ask for the Spraywelder Catalog and Colmonoy Hard-Surfacing Manual No. 79.

*Registered trade-mark

HARD-SURFACING AND BRAZING ALLOYS

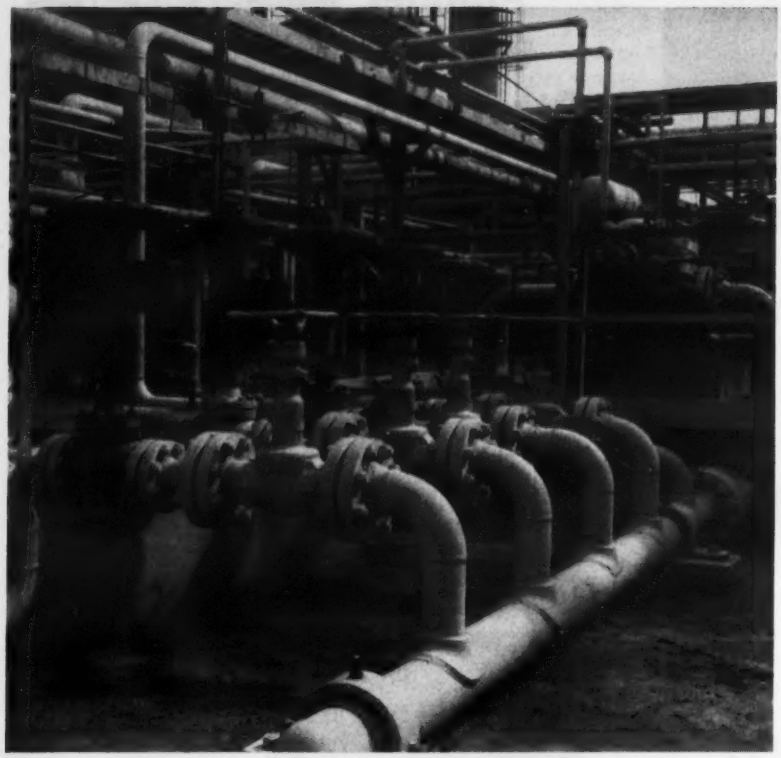
WALL COLMONOY CORPORATION

19345 John R Street • Detroit 3, Michigan

BIRMINGHAM • BUFFALO • CHICAGO • HOUSTON • LOS ANGELES
MORRISVILLE, PA. • NEW YORK • PITTSBURGH • MONTREAL • GREAT BRITAIN

Check 2949 opposite last page.

ORBIT VALVES



ORBIT VALVES installed as "stop" valves in a compressor installation at a large natural gasoline plant in Texas. Compressor is driven with rich oil from four absorbers.

The Orbit Valve's positive closure and non-lubricated feature is ideal for use with pressure regulators, meters, reflux pumps, compressors and similar equipment in areas where repairs must be carried out from time to time. Wherever Orbit Valves are installed, you are assured a safe atmosphere for dismantling equipment and do not have to worry about valve leakage that could create a hazardous working area.

SIZES: 1", 1½", 2½", 3" and 4" ASA 300-lb. through 2500-lb. full opening flanged and screwed ends. Venturi opening available in sizes: 2", 2½", 3", 4" and 6" ASA 150-lb. through 2500-lb. flanged ends only.

SOURCE: Through your favorite industrial supply house.

LITERATURE: Write Department B for Catalog 58-B.

ORBIT VALVE COMPANY
P. O. BOX 699, TULSA, OKLAHOMA
PHONE LUTHER 4-4761, TWX TU 925

Check 2950 opposite last page.

Resistance of gratings

. . . to corrosion, abrasion, chemicals, wear and weathering is increased through recently developed paint process.

Steel grating is cleaned and 2% phosphate solution, heated to 180°F, applied with power spray washer. "Flow-kote" application of Epon-base paint is accomplished with series of top and bottom sprays positioned to provide 1-mil thick cover. Painted grating is baked for 10 minutes at 350°F to cement bond between metal and paint.

Finish is mixture of xylol, Epon resin and color pigment.

Paint performed well in tests equivalent to 3½ years of exposure in salt-laden atmosphere. Finish withstood bombardment by No. 6 heavy gravel for 40 minutes.

(Ponbake grating is development of Blaw-Knox Company, 300 Sixth Ave., Pittsburgh 22, Pa.)

Check 2951 opposite last page.

PVC blower is resistant to chemicals, moisture

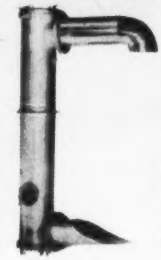
Uses: Blower applications where moisture or corrosion is a problem.

Features: Fan housing and multiblade wheel are fabricoated of rigid polyvinyl chloride. Blower will handle wide variety of chemicals at temperatures to 140°F.

Description: Unit is equipped with direct drive, PVC drain connections. Pedestal is coated with polyvinyl paint.

Units are equipped with ball-bearing motors and are quiet in operation. Weights

ONE SPECIAL UNIT . . . *or a million*



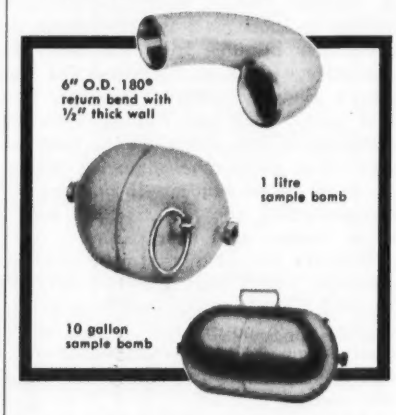
Vacuum pan heater

Requirements for special and standard stainless steel equipment in the chemical field vary widely in point of quantity and design.

That is why the unusual manufacturing and engineering versatility offered by A-P-C matches those requirements so perfectly.

A-P-C's widely experienced engineers are ready to take your ideas or your rough drawings and develop them into precisely the sanitary or corrosion-resistant equipment you want. Or A-P-C will work from *your* engineered drawings to make, literally, ONE UNIT OR A MILLION.

And A-P-C is amply qualified for it is an organization of craftsmen who work *exclusively* in stainless steel and other corrosion-resistant metals.



So, for perfection in craftsmanship, strict quality control, superior manufacturing techniques and ingenious engineering, call in the man from A-P-C.

ALLOY PRODUCTS CORP.
1075 Perkins Ave., Waukesha, Wisconsin

2047

Check 2952 opposite last page.

range from 40 lb for Type CB 1¼ to 65 lb for CB 1½. Former has 1/3-hp motor and 9½" wheel diameter, while latter has ¾-hp motor and 10¾" wheel diameter. Blower rpm is 1725 for both.

(PVC utility blower is product of Industrial Plastic Fabricators, Inc., Endicott St., Norwood, Mass.)

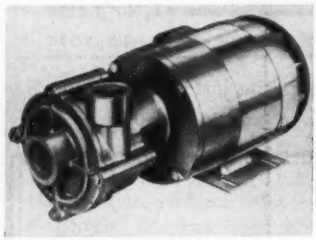
Check 2953 opposite last page.

Pumps 33 gpm out 1" outlet at 28 ft of head

Uses: Continuous pumping duty with certain chemicals and other corrosive liquids.

Features: Pumps up to 33 gpm at pressures up to 28 ft of head through 1" outlet.

Description: Body, face plates and impeller are fabri-



Centrifugal pump for corrosive liquids

cated of Cycolac plastic. Shaft and couplings are 316 stainless steel, and O-ring is neoprene.

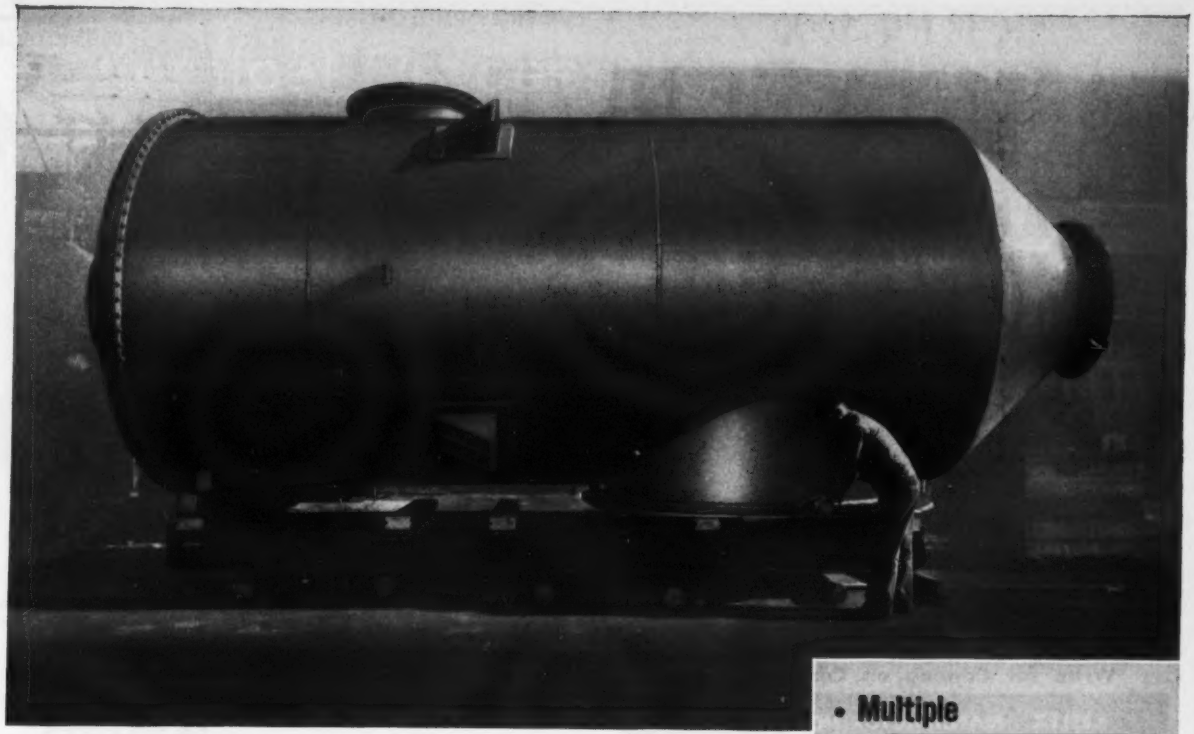
Motor is encased in aluminum. Pumps are available with single-phase or three-phase motor.

Permanent low-drip sealing, requiring no adjustment or maintenance, is provided by rotary mechanical seal of Graphitar.

(Plastic centrifugal pump is product of Houston Fearless Corporation, 11835 W. Olympic Blvd., Los Angeles 64, Calif.)

Check 2954 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



MANHATTAN RUBBER LINED TANKS for PERMANENT Protection against Corrosion and Contamination

Costly process equipment for storing and handling corrosives deserves the degree of protection possible only with specially compounded, acid-proof Manhattan Rubber Linings. Thick, multiple calendered sheets of natural or synthetic rubber assure maximum durability under rough working conditions. The linings expand and contract with the tank metal under temperature changes . . . won't harden or crack. Their protection against most acids and alkalis is as fool-proof as 65 years of advanced technology can provide.

All Manhattan Rubber Linings are bonded to metal so securely actual tests have proved they can't be separated! And every Manhattan lined tank is tested under high voltage to assure flawless protection before being shipped to your plant. If your equipment is too large to ship to Manhattan, skilled crews will do the job at your location.

Be *sure* of permanent protection for your process solutions and equipment. Let an R/M representative show you the advantages of Manhattan Rubber Lined tanks, pipe and process equipment. Contact the Manhattan Rubber Lining plant or sales office nearest you . . . or write direct.

- Multiple Calendered Sheets
- Permanent Protection Against Corrosion, Contamination
- Permanent Rubber-to-Metal Bond
- Resistant to Acids, Alkalis, Abrasion, Temperature
- Largest Facilities Longest Experience
- Rubber Lining Plants at Passaic, N. J. North Charleston, S. C.

Write for Catalog No. 7115

RM 1008

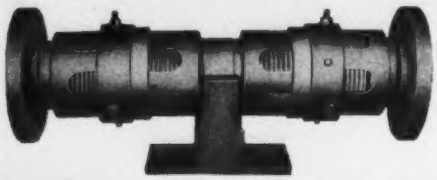
RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

RM

ENGINEERED RUBBER PRODUCTS . . . MORE USE PER DOLLAR

Check 2955 opposite last page.

KEFLEX
LAMINATED
MULTI-PLY
EXPANSION JOINTS
of STAINLESS STEEL



PATENT PENDING

KEFLEX-KETROL cage constructed expansion joints provide internal and/or external torque control and wall protection for bellows in high temperature and high pressure service.

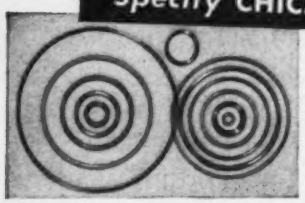
Write for Catalog on Complete Line.

KEFLEX MANUFACTURING DIVISION
of U. S. FLEXIBLE METALLIC TUBING CO.
HEAD OFFICE – 63 MAIN ST., SAN FRANCISCO
FACTORY – LOS ANGELES, CALIF.

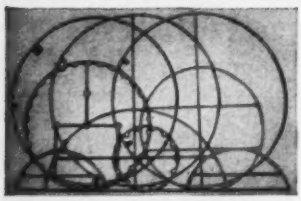
Check 2956 opposite last page.

For Dependable GASKETS

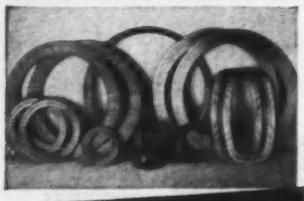
Specify CHICAGO-WILCOX



RING GASKETS
For ring-type flanged joints in high pressure lines. Made of soft iron, standard steel alloys or any non-ferrous metal to any desired cross section. Ask for Bulletin 563.



HEAT EXCHANGER GASKETS
Made in any size or shape needed in double-jacket type. Also cut from solid metal or sheet packing. Ask for Bulletin 564.



CORRUGATED METAL GASKETS
Plain or jacketed type. Made of ingot iron, aluminum, stainless steel, copper, brass, nickel and monel in all sizes and shapes. Ask for Bulletin 565.

CHICAGO-WILCOX MFG. CO.

Prompt Deliveries
7717 So. Avalon Avenue
Chicago 19, Illinois

Check 2957 opposite last page.

CORROSION CONTROL

Polysulfide-epoxy coating protects hopper cars hauling fertilizer

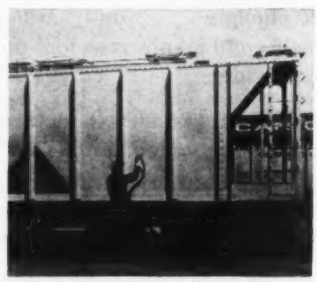
Resists abrasion, corrosion during three-year trial

Problem: Abrasive action of fertilizers such as muriate of potash would scratch away protective coating of steel railroad hopper cars in which

Coating being sprayed on interior of hopper car is expected to last five years

material was shipped. With coating deteriorated, corrosion would begin. Coatings failed in as short a time as six months.

Solution: Polysulfide-epoxy coating was sprayed on both interior and exterior of hopper cars. Polysulfide liquid polymer was used in coating

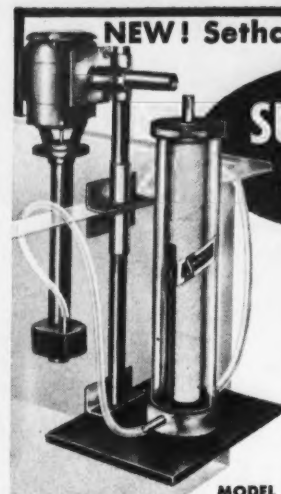


Hopper car used for hauling harsh fertilizers is being protected with coating which will resist abrasive and corrosive action of harsh fertilizers and chemicals

to provide toughness and impact resistance over wide temperature range. It also improved adherence of coating.

Results: Coating on test car was in excellent condition after three years service

NEW! Sethco corrosion proof



SUMP PUMP AND FILTER

handles all acid, alkaline solutions and solvents up to 250°

Self - priming, leakproof Epoxy sump pump provides continuous duty performance. Bracketed inside the tank, it requires no floor space. Outside bracket supports High Temp. Lucite or Epoxy filter chamber . . . resistant to all corrosive solutions and solvents. ½ or ¾ HP motor. Pump and filter chambers are available separately.

MODEL UAL-20
200-300 Gals./Hr.

Complete details on Sethco Specification Sheet No. 751

WRITE for NEW illustrated 8 Page Brochure . . . complete line of SETHCO FILTER PUMP UNITS (50 to 2700 Gals./Hr) providing Depth Filtration for all chemical applications. Includes special informative 'Filter Pump Selection Guide'

Sethco

MAyfair 3-4220

2287 BABYLON TURNPIKE, MERRICK, L. I., NEW YORK

Check 2958 opposite last page.

What's
A "New Solution?"

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

transporting muriate of potash.

North American Car Corporation has coated 100 cars, anticipating that coating will endure at least five years service. This will reduce maintenance time needed to keep cars operative.

(Hopper cars with polysulfide-epoxy coating are product of North American Car Corporation, 231 S. LaSalle St., Chicago 4, Ill.)

Check 2959 opposite last page.

(Thiopox commercial coating for application to cars is furnished by Phelan Faust Paint Manufacturing Company, 932 Loughborough Ave., St. Louis, Missouri.)

Check 2960 opposite last page.

(Polysulfide liquid polymer used in coating is product of Thiokol Chemical Corporation, 780 N. Clinton Ave., Trenton 7, N.J.)

Check 2961 opposite last page.

Filter-fabric cements resist corrosives

Uses: Patching filter fabrics.

Features: Solvent-type cement resists concentrated acids and alkalis, while two-component epoxy cement resists acids, alkalis, and solvents.

Description: Solvent-type cement dries by evaporation of solvent, leaving tough film of acrylonitrile-vinyl chloride copolymer. Will not leach out, so it may be used in filtration involving foodstuffs, pharmaceuticals, and high purity chemicals. Adheres well to spun staple synthetic fibers and cotton fabrics.

Epoxy cement has tensile shear strength of 2000 lb/in when cured at room temperature. Adheres even to monofilament yarn fabrics, and is recommended for centrifuge bags, press cloths, and dust-collection bags.

(Vicel (solvent type) and Nycel (epoxy cement) are developments of Technical Fabricators, Inc., 136 Washington Ave., Nutley, N.J.)

Check 2962 opposite last page.

Chemical Processing Installations... Faster...Easier...More Economical

WHEN YOU START WITH FANSTEEL STANDARD STOCK EQUIPMENT

Setting up a new processing line? Need a condenser? A bayonet heater, thermowell or any other tantalum acid-proof equipment? You don't have to start from scratch.

You can start with a standard Fansteel unit—delivered from stock. For most normal applications, you'll find just the size, just the design of tantalum equipment you need *in stock* at Fansteel.

You get delivery in a hurry . . . there's no delay in setting up new installations . . . little interruption to production schedules when replacing equipment. It's the easy way . . . and it's the economical way.

As the oldest and largest manufacturer of acid-proof tantalum equipment, Fansteel is able to produce in quantities that mean substantial savings. You eliminate at the outset the high costs of designing and building custom units. And you also get the benefits and economies of doing business with the only supplier of tantalum equipment who performs the entire job—from ore to metal to the finest corrosion control equipment available.

IMMEDIATE DELIVERY ON THESE SIZES—FANSTEEL TANTALUM EQUIPMENT

BAYONET HEATERS

Single Tube

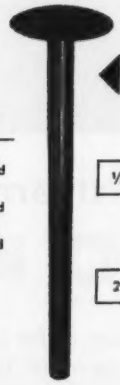
Length	Diameter
18"	1"
30"	1½"
48"	1½"
60"	1½"

Three-Tube

Length	Diameter
69"	1½"

TAPERED CONDENSERS

Length	Diameter
36"	3"-wide end 2"-narrow end
60"	6"-wide end 2"-narrow end
60"	8"-wide end 4"-narrow end



THERMOWELLS

Stocked Tubing I.D.:

½"	¾"	⅞"	1"	1¼"

Stocked Flange O.D.:

2"	2⅞"	3⅝"	5"	6⅜"

G601

FANSTEEL

Address inquiries to: Equipment Department, Metals and Fabrication Division

FANSTEEL METALLURGICAL CORPORATION

North Chicago, Illinois, U. S. A.

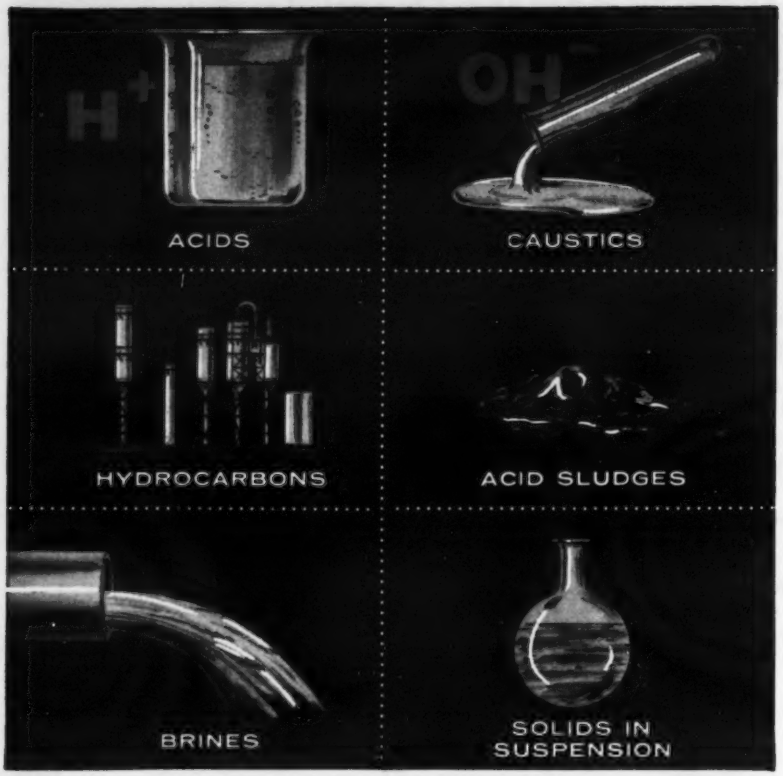
Check 2963 opposite last page.

AMPCO®

Do you have to

COPE WITH THESE CONDITIONS

to keep on stream?



you combat them all with an AMPCO® METAL

What can a copper-base alloy do for you? Whatever it is, there's a grade of Ampco Metal — or other Ampco alloy — that does the job exactly.

Equally important, you can select the best, most economical form of production — fabrication, sheet, plate, tubing, pipe and fittings, extrusion, forging, sand casting, centrifugal casting.

Call in your Ampco field engineer.

6-22

AMPCO METAL, INC., Dept. 130A, Milwaukee 46, Wis.
WEST COAST PLANT: BURBANK, CALIFORNIA • SOUTHWEST PLANT: GARLAND (DALLAS COUNTY), TEXAS

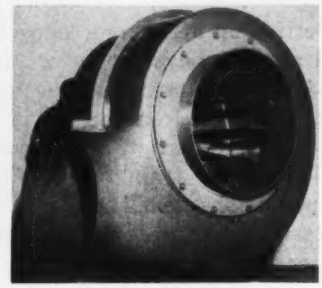
Check 2964 opposite last page.

Variety of corrosives withstood by PVC utility blowers

Uses: For use in laboratories where corrosive fumes or moisture are a problem. Blowers are particularly adaptable to laboratory hood exhaust systems.

Features: Unplasticized rigid polyvinyl chloride used for construction of blowers resists almost all types and combinations of fumes.

Description: Blowers are equipped with rigid PVC



Compact PVC blower

housing and PVC multi-blade wheel. They are available in capacities from 399 to 2000 cfm. Temperatures up to 140°F at blower inlet can be withstood.

(PVC blowers are product of Industrial Plastic Fabricators, Inc., Endicott St., Norwood, Massachusetts.)

Check 2965 opposite last page.

Epoxy-bitumen coating has excellent adhesion

Uses: For coating in the inside and outside of pipe, metal and concrete.

Features: Coating has excellent adhesion and chemical resistance.

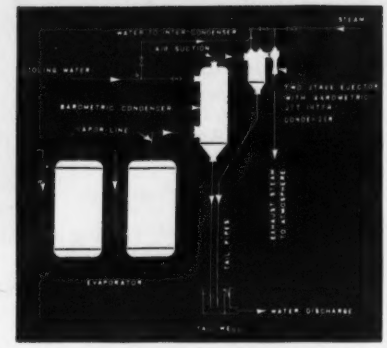
Description: Coating is based on Epon 828 and Bitumen C, a compatibilized bitumen. Coating has high solids and can be applied in one application.

(Epon-bitumen coating is development of Shell Chemical Corporation, 50 West 50th St., New York 20, N.Y.)

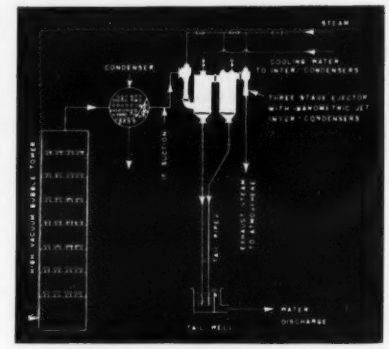
Check 2966 opposite last page.

Here's how to get high vacuum at lower cost... from

C. H. WHEELER



In Evaporation, C.H. Wheeler Tubejet® Ejector works with Wheeler Barometric Condenser in flow diagram above to produce high vacuum. Initial cost of Ejector is low and installation is easy because of light weight and simple connections.



In Refining Operations, diagram above shows how to create high vacuum in bubble tower. Three-stage Tubejet Ejector draws off exceptionally large volumes of gases, vapors. Absence of moving parts and use of corrosion-resistant materials (stainless steel, bronze, cast iron) result in very low maintenance costs. Many Tubejets, in fact, have operated more than 35 years without major replacement of parts!

FREE! 35-page catalog showing flow diagrams for many efficient, money-saving vacuum operations. Ask for Catalog 1462.

Process Equipment Division

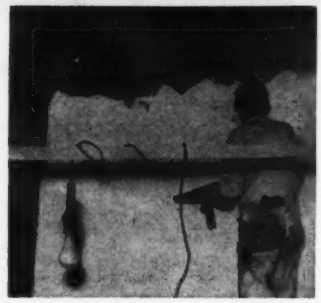
C. H. WHEELER MFG. CO.

19th and Lehigh Avenue • Philadelphia 32, Pa.

Steam Jet Vacuum Equipment • Centrifugal, Axial and Mixed Flow Pumps
Steam Condensers • Marine Auxiliary Machinery • Nuclear System Components

Check 2967 opposite last page.

Brandy storage tanks at Cucamonga Vineyard are protected from corrosive action of 95% ethyl alcohol by epoxy coating. Flavor and quality of stored product are protected



Trowelling epoxy coating on interior tank walls. In spite of tank's "oil canning" during filling and emptying coating has not cracked, blistered, or peeled

Protecting brandy from discoloration or unwanted flavors requires reliable, chemical-resistant storage facilities. With material held one to six months . . .

Epoxy coating guards quality of stored ethyl alcohol

THEODORE W. WETT
Associate Editor
with **FRANK PILONE**
Plant Manager
Cucamonga Vineyard Co.
Cucamonga, Calif.

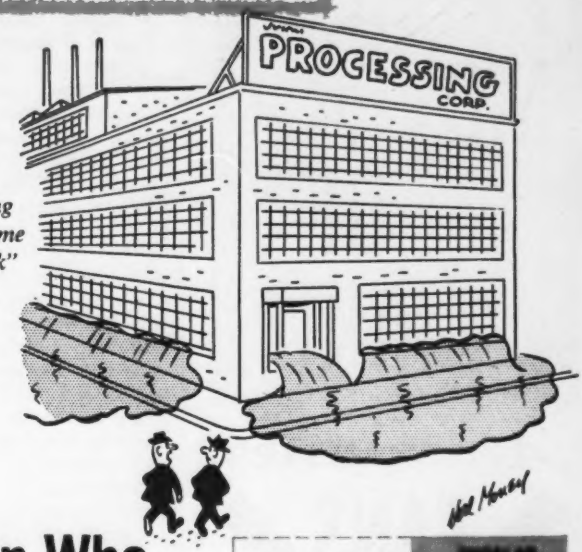
PROBLEM: Brandy receiving tanks have to withstand prolonged exposure to 95% ethyl alcohol at Cucamonga Vineyard Co. Material contains approximately 500 to 1000 ppm of fusel oil and 15-25 ppm of miscellaneous aldehydes, such as acetaldehyde. Alcohol enters tank from still at approximately 80°F. Tank is sealed. Contents, after inspection by ATTD gager, are stored until needed. Storage time ranges from one to six weeks at room temperature.

To maintain quality of finished product, interior of tank cannot contribute any contamination that might discolor or flavor stored material.

Solution: Storage tanks were lined with an epoxy coating as follows:

1. Thorough sandblasting
2. Vacuum cleaning
3. Resin and hardener were mixed and trowelled onto surface to a thickness of approximately 0.030 inches.
4. Coating was allowed to cure for 24 hr at room temperature, followed by two days at approximately 120°F by means of local space heater.
5. Cured surface was thoroughly scrubbed with a high-grade detergent followed by thorough rins-

Life in these excited states...



"Sunday morning is no time to call me about a little leak"

For Men Who Work 24 Hours a Day

Like the phone ringing when you're in the shower, corrosion and contamination wait for no man. Best way to confine it to normal working hours is to specify trouble-free Ace chemical-resistant equipment by American Hard Rubber Company. Best for the money anywhere... backed by 108 years of experience.

All-purpose rigid PVC. Sched. 40, 80 & 120, ½ to 4". Threaded or socket-weld fittings. Valves ½ to 2". NSF-approved. *Bul. CE-56.*

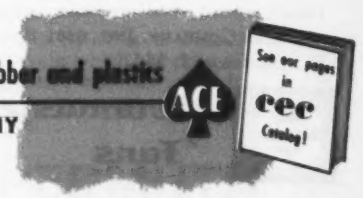
Improved design . . . now 12 gpm. All wetted parts acid-resistant, wear-resistant Ace hard rubber. Finest available. *Bul. CE-55.*

Flexible poly pipe, ideal for water lines, drains, underground pipe or conduit. Sizes ½ to 2", long coils, NSF-approved for drinking water. *Bul. CE-57.*

World's best chemical valves . . . at moderate prices. All-plastic, rubber-lined, or all-hard-rubber. ⅛" pet cocks to 24" gate valves.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey



Check 2968 opposite last page.

ing and drying.

6. Entire interior of tank was thoroughly scrubbed with 95% ethyl alcohol.

Resin used (Epocast 541) is a white, thixotropic, 100%-solids, epoxy coating material filled principally with titanium dioxide. Hardener (9810) is a clear amber non-dermatic polyamine liquid.

After first filling of tank and consequent emptying, lining was examined thoroughly and found to contain about a dozen minor pinholes which were observed by development of small, red rust spots. Spots were thoroughly sandpapered and repatched with same epoxy coating.

Results: After more than a year of service, tank coating, as determined by visual examination, is in as excellent condition as it was originally. There are no areas of softening, blistering, peeling, or cracking in spite of fact that tank did "oil can" during filling and emptying.

A very small weld spatter area in upper observation port was observed to have been coated more thinly than balance of tank. At this point a very slight amount of rust developed. Before tank was put back into operation, this area (about four square inches) was sanded and recoated.

(Epocast 541 epoxy coating is a product of Furane Plastics Incorporated, 4516 Brazil St., Los Angeles 39, Calif.)

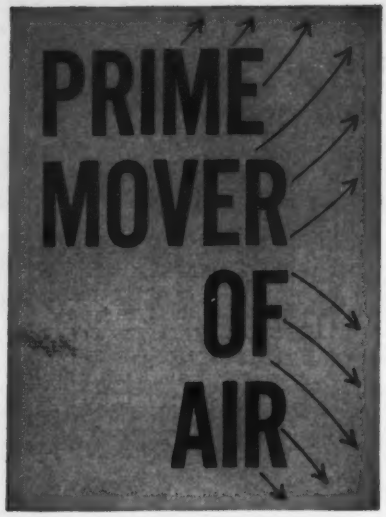
Check 2970 opposite last page.

Plastic tank covers light, strong and resistant to heat, corrosion

Uses: Tank covers for handling strong acid solutions at elevated temperatures.

Features: Lining, painting and other maintenance operations are eliminated. Covers offer high strength/weight ratio, plus extreme resistance to heat and corrosion.

Description: Fabricated of reinforced plastic which can be drilled, sawed or molded to practically any desired configuration, covers have I-beam construction and reinforced



Aeromaster

FANS

higher efficiency

lower operating costs

Aeromaster Fans move *hot* air more efficiently by delivering *more* CFM and requiring less horsepower. Adjustable pitch heat-treated aluminum alloy blades have excellent corrosion-resistance qualities. Used in refineries, gas transmission stations, steel mills and industrial plants for major heat transfer systems. 4 to 6 blade fans available 54" to 22' diameters. For more details on fans that cost less to install, operate and maintain, write: KOPPERS COMPANY, INC., 8301 Scott St., Baltimore 3, Md.

KOPPERS Aeromaster Fans

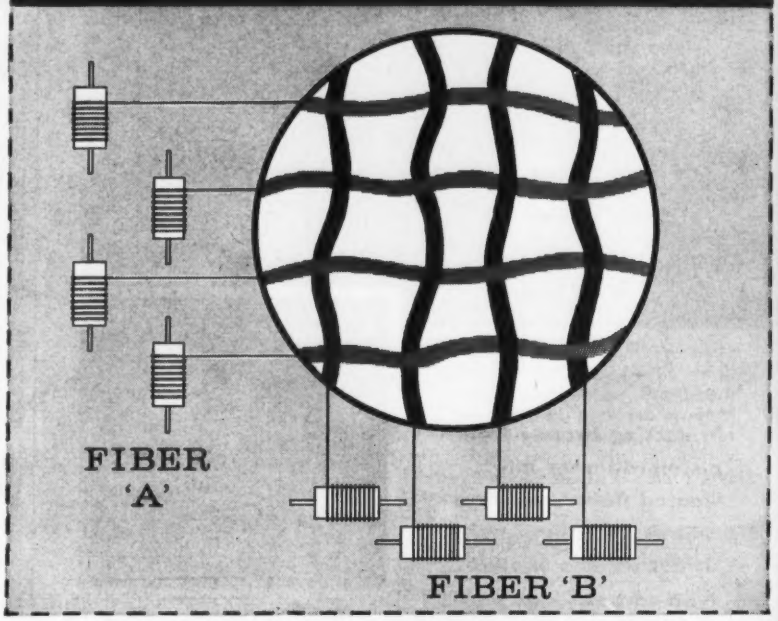
Engineered Products Sold with Service

Check 2969 opposite last page.

FOR IMMEDIATE RELEASE

COMBINATION FABRICS

created for the TOUGHEST filtration problems!



SUPERIOR ABRASION RESISTANCE, GOOD CAKE PICK-UP AND RELEASE

Now NFM blends a combination of required performance qualities into custom fabrics to fit any specific filtration process. *Example:* for rugged strength and easy cake discharge, we take smooth filaments of linear polyethylene or PVC as the warp, and weave them with filling yarns of spun or staple dynel or orlon for good cake retention. The variety of available hyphenates (PVC-dynel, linear polyethylene-dynel, linear polyethylene-orlon, and similar combinations with polypropylene) permits the looming of fabrics to any desired formula of tensile strength, abrasion resistance, heat tolerance, chemical resistance, cake retentivity and release. This flexibility in combining yarn characteristics means you can specify an NFM cloth that answers your difficult filtering problem most efficiently and economically.

Tell us your application, we will send you samples

Weavers of Industrial Filter Media for over Fifty Years

NFM TIONAL FILTER MEDIA *Corporation*

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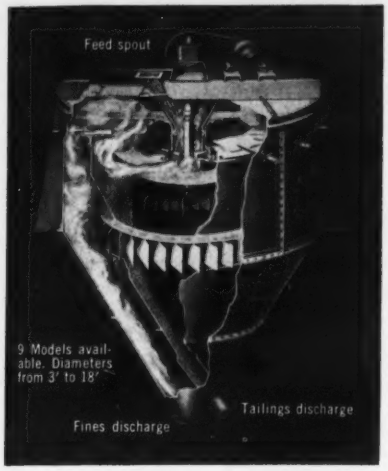
Elizabethton, Tenn.: Paul Chapman Assoc., Box 787
Cincinnati, Ohio: Roselawn Center Bldg.
Houston, Texas: 1607 Jefferson Avenue
Pensacola, Fla.: Chem-Quip Co., 1102 Texar Drive

Check 2971 opposite last page.

Size Requirements Getting Tougher?

Sturtevant Air Separators Increase 40 to 400 Mesh Output as Much as 300%



Closed-circuit air separation is of proved advantage in reduction processes. Result is a better, more uniform product. Grinding mills perform at top efficiency, output frequently increases as much as 300%, power costs drop as much as 50%.

Precise separation of all dry powdered materials. Sturtevants currently classify sulfur, soybeans, phosphate, chocolate, feldspar, sand and aggregates, pigments, limestone fillers, flour, abrasives, plastics, gypsum, ceramics, cement and other products.

Improve screening — Sturtevant Air Separators prevent blinding by removing undesirable tailings *or* fines from screen feed loads.

Works Like Winnowing Done in a Whirlwind

Sturtevant Air Separators do a mechanical job of winnowing. Precise control of whirlwind air currents and centrifugal force results in the desired size being lifted into fines cone, oversize falling into tailings cone.

A 16 ft. Sturtevant, for example, has taken a feed rate of 800 tph, containing only a *small* percentage of desired fines, and delivered 30 tph 90% 200 mesh, recirculating the oversize through the grinding circuit.

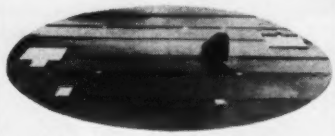
Send for Bulletin No. 087.

STURTEVANT
MILL COMPANY
119 Clayton St., Boston, Mass.
Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators

Check 2972 opposite last page.

outer perimeter to make them completely self-supporting.

All stiffeners, manholes and access openings are molded from same plastic. Exposed areas may be veiled with Orlon to increase resistance.



Half-inch thick and 25' in diameter, cover will support two 200-lb men at any one point

Covers can be made to retard fire and resist heat distortion at operating temps ranging from 280 to 300°F.

(Duracor tank covers are produced by The Ceilcote Company, 4832 Ridge Rd., Cleveland 9, Ohio.)

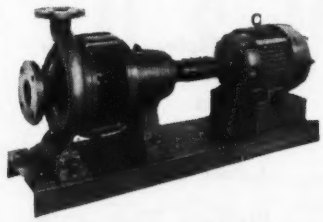
Check 2973 opposite last page.

Solids pumping feasible with open impeller

Uses: Pumping highly corrosive materials in chemical, petrochemical and general process industries.

Features: Open impeller permits handling of solids. Pump may be dismantled for servicing without disturbing either suction or discharge pumping.

Description: Available in 14

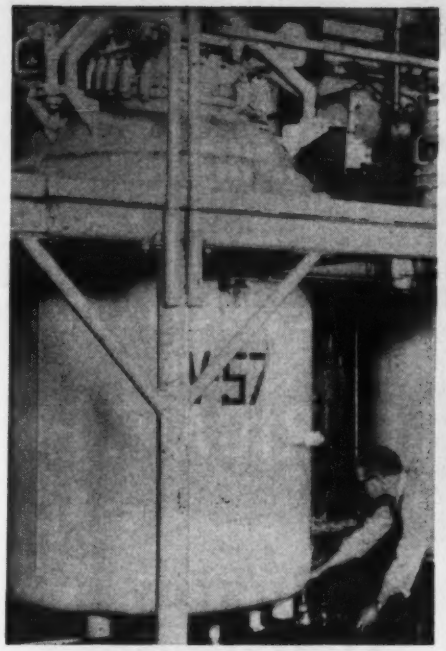


High-alloy open-impeller centrifugal pump

sizes in wide range of corrosive-resistant alloys, centrifugal pumps have centerline inlet and discharge.

(pH high-alloy chemical pumps are manufactured by Dean Brothers Pumps, Inc., 323 W. 10th St., Indianapolis 7, Indiana.)

Check 2974 opposite last page.



FLUIDICS AT WORK

IN LAB, PILOT PLANT, OR PRODUCTION

Why all your corrosive reactions should be done in a single material—GLASTEEL

When you work with corrosive acids and/or mild alkalies, you can eliminate the variables of process environment by using Glasteel reactors *all the way* from research to pilot plant to full-scale production.

You can get Glasteel reactors with 1-gallon capacity or as large as 4000 gallons . . . all made from Glasteel 59, which resists all acids (except hydrofluoric) and all the mild alkalies.

Glasteel 59 reactors also give added insurance against thermal shock . . . 30% more resistance than the best previous glassed steel. Operating temperatures to 450° F.

Lab Sizes: 1, 2, 3 gal. From vacuum to 750 psi.
P Series: 5 to 100 gal. 25 psi; 150 psi also available through 50 gal.
E Series: 50 to 2000 gal. 25, 50, and 100 psi through 750 gal.; 75 psi on larger sizes.
R Series: 300 to 4000 gal. 100 psi.

Popular sizes are pre-stocked for ten-day delivery.

Alloy reactors. A complete line of reactors is available in stainless steel and other alloys to solve specific corrosion problems.

Wonder metals. Need a reactor of tantalum, titanium or zirconium—lined or solid? Pfaudler Permutit craftsmen are skilled in fabricating these metals, as well.

New FLUIDICS Buyer's Guide. You can get more specific data on these reactors and other products and services offered under the FLUIDICS program for solving problems involving fluids. Write our Pfaudler Division, Dept. CP-10. Rochester 3, New York for a copy of Bulletin 980.

FLUIDICS is a Pfaudler Permutit program which provides a modern, imaginative approach for handling and processing more profitably liquids and gases.

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Specialists in FLUIDICS . . . the science of fluid processes

Check 2975 opposite last page.

Free! Sample Tube of MOLYKOTE® G LUBRICANT

Industry's NEWEST Production TOOL

- ALMOST 100% SAFETY AGAINST GALLING AND SEIZING WITH ALL BEARING METAL COMBINATIONS
- ELIMINATES STICK-SLIP, METAL PICK-UP AND DISTORTION IN PRESS FITTING
- REDUCES WEAR-IN TIME AND DAMAGE IN NEW OR REBUILT MACHINERY
- THE HIGHER THE LOADS, THE GREATER THE MARGIN OF SUPERIORITY OF MOLYKOTE G

Write for your free sample of MOLYKOTE G LUBRICANT today. We will also send you a copy of our new Bulletin 126 which gives complete details. THE ALPHA-MOLYKOTE CORPORATION, 65 Harvard Avenue, Stamford, Conn. Phone Fireside 8-3724. Plants in Stamford, Conn., Munich, Germany and Strasbourg, France.

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MOLYKOTE G
LUBRICANT

Check 2976 opposite last page.

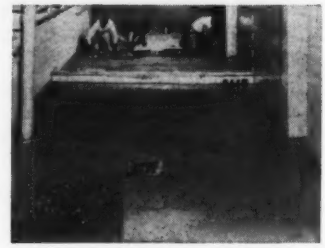
Corrosion, cracking, impact resisted by flooring

Combines chemical resistance with beauty

Uses: Typical applications include laboratories, pharmaceutical plants and breweries.

Features: Flooring material has the beauty of terrazzo, along with extreme corrosion resistance and high strength.

Description: Material is mixed by blending the liquid, aggregate and hardener in the concrete mixer. Terrazzo effect is obtained through the use of silica or marble chips. A variety of different colors can be obtained.



Terrazzo flooring can be applied by trowel or other cement finishing tools

(Corocrete terrazzo flooring is product of The Ceilcote Company, 4832 Ridge Rd., Cleveland 9, Ohio.)

Check 2977 opposite last page.

Primer solves problem of blistering on tanks

Penetrates surface, prevents further corrosion

Problem: White surface of a storage tank was being stained yellow by rust leaching from thousands of blisters at metal-coating interface. Since tank was subjected to considerable condensation during early morning hours, this was apparently the cause of the trouble.

Solution: Laboratory tests were undertaken to see if failure could be duplicated. A humidity cabinet operating at 100% relative humidity and 95°F reproduced this type of blistering.

In the course of further investigation, a proposal was made that the problem might be solved by studying the wetting of the metal substrate. Various wetting agents were tried until finally one stood out above the others.

This one agent, a phenolic resin material called Rustmaster®, was formulated into a line of primers. It was found that this agent provides penetration of a poorly prepared surface. Penetrating liquid draws the vehicle and the pigment into the rusty surface, protecting it from further corrosion.

Results: Use of this primer, in combination with intermediate and finish coats, solved the problem of blistering on the tank. No further evidence of this type of failure on tank has been observed.

(Condensed from technical paper, "An Approach to Protective Coating Engineering," which was presented at the 1959 Annual Meeting of the National Association of Corrosion Engineers in Chicago. It was prepared by Austin K. Long, The Glidden Company, 11001 Madison Ave., Cleveland 2, Ohio.)

Check 2978 opposite last page.

"After studying this idea of yours, I'd be inclined to say that if another idea hits you, you should hit back."

Smooth sailing

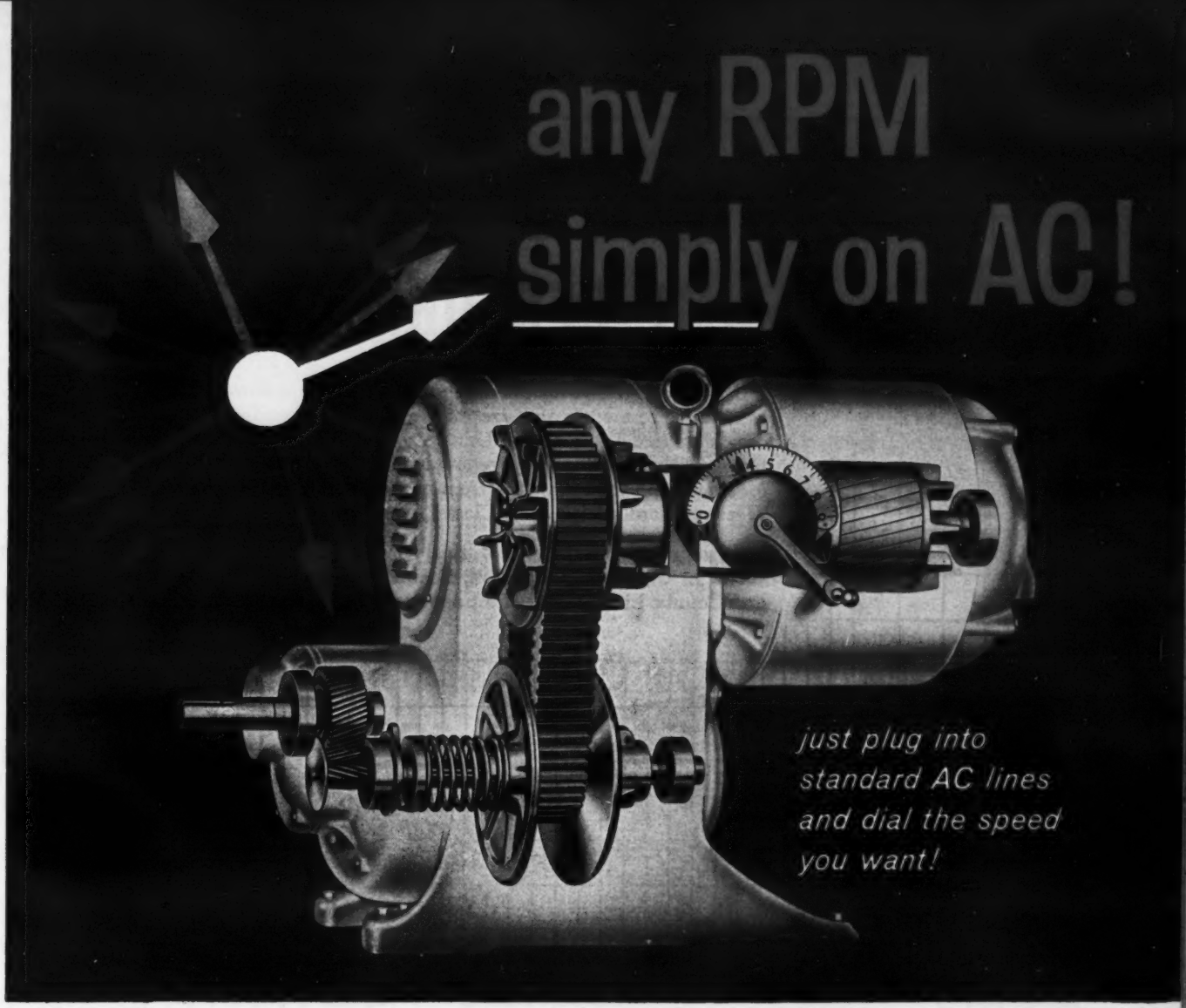
Waters of the harbor at Dover, England, are calmed by air bubbles that break up the incoming waves. Air is carried to entrance of harbor by polyethylene piping and fittings.

Vest pocket laboratory

On-the-spot tests to determine whether bacteria is present can now be made by field workers using a test kit which fits into a coat pocket or handbag. The kit comprises a plastic plate and cover divided into two sections with two layers of nutrient agar. There also are two glass ampules, each containing sterile water and a cotton swab sealed inside. Talb Industries, Inc., Philadelphia, makes the kit.

Tough bubble

A plastic bubble that won't burst under impact of a .45 caliber bullet or temperatures of up to 400°F has been developed by Goodyear Aircraft Corporation to protect pilots of supersonic aircraft.



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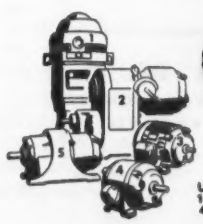
...one unit...infinite speeds!

So *simple* to get any speed you want, directly from standard AC power lines—with U.S. VARIDRIVE MOTORS! One compact, self-contained unit does it. With U.S. VARIDRIVE, you don't have to buy a DC converter, DC generators, complicated and delicate electronic circuits. Just *plug in* this one simple unit—dependable, easy for your regular personnel to maintain. You merely dial, and get smooth, stepless speed changes immediately! Thus, you set speeds for maximum production as needs vary...*increase* machine efficiency...output...product quality! *Decrease* costs...rejects...manpower and materials waste! Available in RATINGS: ¼ to 75 H.P. Specify: "U.S. VARIDRIVE MOTOR."



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1. Vertical Solid & Holloshaft, 2. Varidrive, 3. Totally-Enclosed, 4. Uniclosed, 5. Syncrogear. Also, many other special motors.

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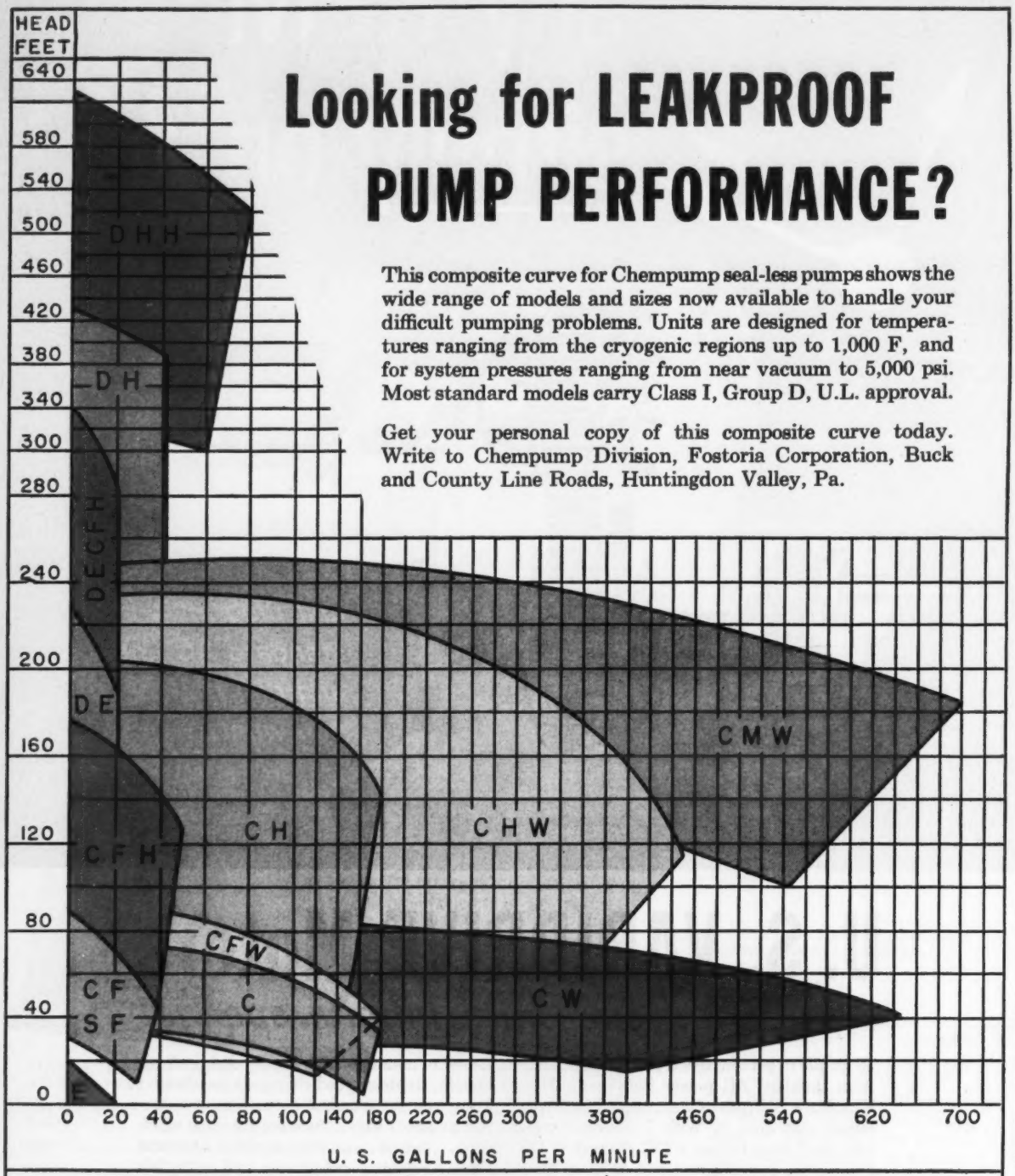
...Send for U.S. Varidrive Bulletin No. 1797

Check 2979 opposite last page.

Looking for LEAKPROOF PUMP PERFORMANCE?

This composite curve for Chempump seal-less pumps shows the wide range of models and sizes now available to handle your difficult pumping problems. Units are designed for temperatures ranging from the cryogenic regions up to 1,000 F, and for system pressures ranging from near vacuum to 5,000 psi. Most standard models carry Class I, Group D, U.L. approval.

Get your personal copy of this composite curve today. Write to Chempump Division, Fostoria Corporation, Buck and County Line Roads, Huntingdon Valley, Pa.



This composite curve is intended to show relative head-capacity performance of Chempump seal-less pumps. It is to be used as a guide to specific model performance curves, available on request. All units are single stage except those with "D" in model designation which are two-stage pumps. Curves are based on 60-cycle operation.

COMPOSITE CURVE

CHEMPUMP
DIVISION • FOSTORIA CORPORATION
HUNTINGDON VALLEY, PENNSYLVANIA

Check 2980 opposite last page.

NEW LITERATURE

Corrosion Control

PVC products such as pipe, fittings, valves, sheet, bar and ducts are discussed in 26-page bulletin. Engineering information is given on each item. PVC Bul — Colonial Plastics Mfg. Co., Subs. The Van Dorn Iron Works Co.

Check 2981 opposite last page.

Stainless sealing devices for bolts, studs, and other fasteners and fittings are covered in catalog. "Stat-O-Seals" — Parker Seal Company, Div. of Parker-Hannifin.

Check 2982 opposite last page.

Reinforced plastics for corrosion-resistant fume and dust-control systems are discussed in brochure "Reinforced Plastics" — Industrial Sheet Metal Works.

Check 2983 opposite last page.

Wood tanks, the chemical resistance of wood, round and rectangular tank design, foundations, maintenance and care of wood tanks, impregnated and plastic-lined tanks are discussed in 32-page handbook. "Wood Tank Engineering Handbook" — Arrow Tank Co., Inc.

Check 2984 opposite last page.

Rigid PVC products, their properties and applications, are described in detail in 24-page Cat RV-59 — Kaykor Industries, Inc., Div. of Kaye-Tex Mfg. Corp.

Check 2985 opposite last page.

Heat exchanger tubes made of a number of different metals as well as combinations of metals for controlling corrosion from a large number of different chemicals are covered in four-page bulletin. "Bridgeport Tubes" — Bridgeport Brass Company.

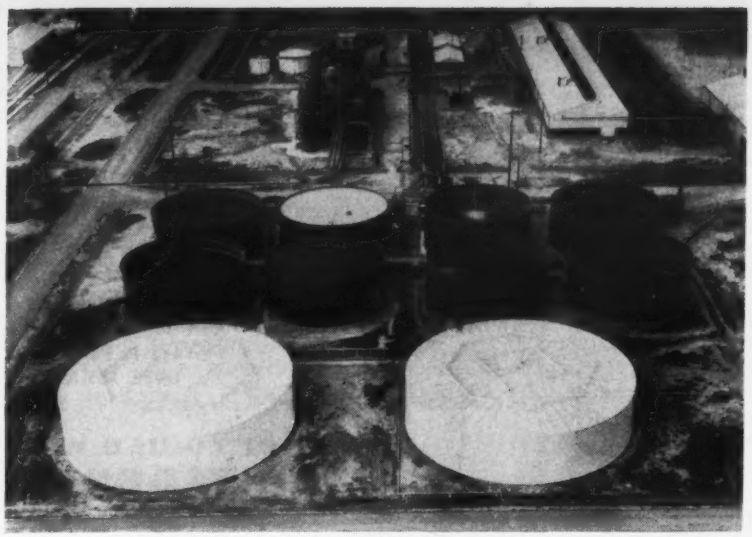
Check 2986 opposite last page.

Asphalt-asbestos coatings for protecting structural steel and other materials are described in 12-page booklet. "Asphalt-asbestos Coatings" — Lake Asbestos of Quebec, Ltd., Subs. of American Smelting & Refining Company.

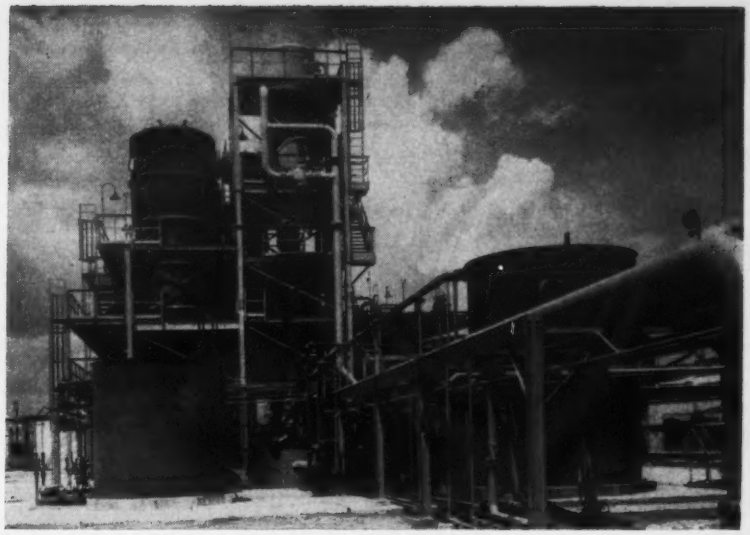
Check 2987 opposite last page.

Corrosion-resistant alloy, known as Ni-o-nel, which can handle severely corrosive hot acids and oxidizing chemicals, is discussed in detail in booklet. "Engineering Properties of Ni-o-nel" — Huntington Alloy Products Div., The International Nickel Company, Inc.

Check 2988 opposite last page.



Two 50% caustic tanks in foreground have roof structurals on outside, making it much easier to apply lining to interior. Eight open-top unlined tanks are used for brine and 10-12% caustic



Open-top solid nickel tank in left foreground stores 43% caustic at temperatures up to 300°F. Other solid nickel tank, behind tank at right, stores 73% caustic at about 230°F

SPECIAL TANKS WITHSTAND CORROSION, PROTECT PURITY OF CAUSTIC

Two 100′ storage vessels for 50% caustic at ambient temperatures are designed with structurals on outside, leaving interior smooth for easy application of protective coating — while two solid nickel tanks are used for more severe services

cp U.S. and WORLD PETROCHEMICALS

Several years of satisfactory service with only minimum maintenance is expected from 19 tanks in caustic-chlorine plant recently placed on stream at Jefferson Chemical Company, Port Neches, Texas. Tanks are designed to assure control of corrosion for specific conditions as well as to avoid iron pickup by caustic.

Large, Cone-roof Tanks

Two special cone-roof tanks, 100′ in diameter by 23′ high, for storage of low-iron caustic at ambient temperatures, were designed with structurals on outside. External roof structure is supported by several internal columns. In addition, all internal lap joints were full-fillet welded and all welds were ground smooth.

This type of construction resulted in a smooth interior, making it easy to apply lining designed to avoid corrosion and prevent iron pickup by caustic in storage.

These tanks were lined with a neoprene coating known as Columbia No. 7, widely used in caustic storage tanks. One coat of primer and 20 coats of the lining were applied for a total thickness of 20 mils. In addition to the large cone-roof tanks, two smaller filtered caustic rundown tanks are lined with neoprene in the same manner.

Nickel Tanks

Two solid nickel tanks for more severe service are used at Jefferson Chemical. One of these, a cone-roof tank 16′ high and 15′ in diameter, is used for storage of 73% caustic at about 230°F. This tank is insulated and equipped with external heating coils.

Other solid nickel tank is 12′ in diameter by 12′ high and has an open top. It is used in connection with evaporator system as a first effect holding tank. It normally contains 43% caustic at temperatures to 300°F.

Thirteen additional tanks, all of them open-top, unlined carbon steel vessels, are used in the new caustic-chlorine plant. Eight largest, 65′ diameter and 26′ high, are shown in photo at left behind the two large cone-roof tanks.

Six of these large unlined tanks are used for storage and treatment of brine and two store 10-12% caustic at 140°F. Three smaller tanks contain sand filter beds and are used for purifying brine. Of two remaining tanks, one is used as a brine saturator and the other as a washdown tank.

(Tanks were built by Graver Tank & Mfg. Co., Div. of Union Tank Car Co., 4809 Tod Ave., East Chicago, Ind.)

Check 2989 opposite last page.

(For further information on low-iron caustic contact Jefferson Chemical Co., Melrose Bldg., Houston 6, Texas.)

Check 2990 opposite last page.

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Sustained Accuracy,
even on the
toughest
jobs

★ Exclusive Helicoid movement has no gears, no teeth. Shock-proof construction protects accuracy through millions of cycles.
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Write for Catalog DH-65.

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Helicoid Gage Division
American Chain & Cable Company, Inc.
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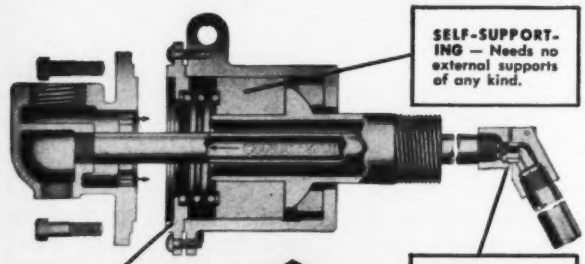
Check 2991 opposite last page.


SELF-SUPPORTING — Needs no external supports of any kind.
ASSEMBLY PLATE — Holds internal parts in position when head is removed.
SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

Johnson Rotary Joint with SYPHON ELBOW

Johnson Joints represent the best way industry has yet found to get steam or liquids into rotating rolls and cylinders. They are completely packless, need no lubrication or adjustment. The Type SBP shown gets steam in, condensate out, through the same head. Other types available for through flow service, in sizes to meet all operating needs. ***WRITE FOR COMPLETE INFORMATION.***

The Johnson Corporation
826 Wood St., Three Rivers, Mich.

Check 2992 opposite last page.

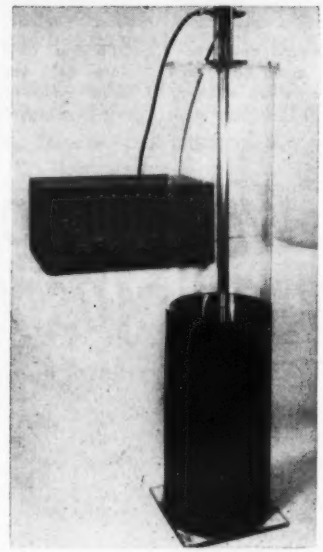
PETROCHEMICALS

Liquid level measured continuously by means of sound waves

Uses: For measuring liquid level in liquid nitrogen, many slurries, thick oils, fused salts, molten metals, and many other fluids.

Features: Method provides continuous and precise measurement of liquid levels.

Description: Method uses sound waves to derive its information. Measuring system is fully transistorized. Output



Level of a wide variety of products can be measured by sound wave principle

is either digital or continuous and adaptable to recording and control, proportioning, and blending.

(Liquid level measuring unit is product of General Ultrasonics Co., Div. of Acoustica Associates, Inc., 6 Tobey Road, Bloomfield, Conn.)

Check 2993 opposite last page.

Production of benzene

. . . from feedstocks such as toluene, xylenes and heavier aromatic mixtures is possible with catalytic hydrodealkylation process now available for licensing.

Process may also be applied for manufacture of phe-

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STAYS IN PLACE UNTIL ASSEMBLY.

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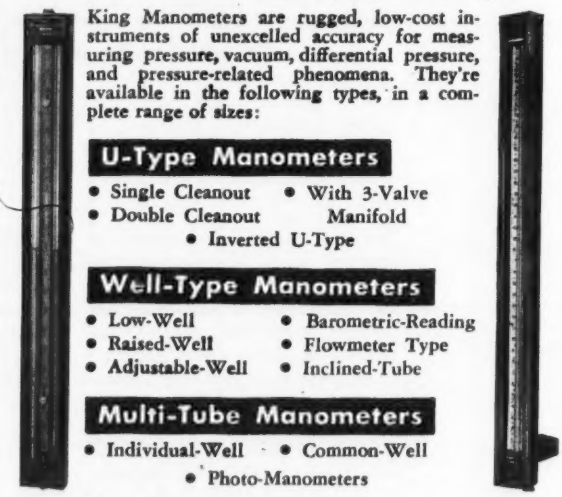
Check 2994 opposite last page.

***King* MANOMETERS**
For Plant and Laboratory



King Manometers are rugged, low-cost instruments of unexcelled accuracy for measuring pressure, vacuum, differential pressure, and pressure-related phenomena. They're available in the following types, in a complete range of sizes:

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- Double Cleanout
- With 3-Valve Manifold
- Inverted U-Type

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- Low-Well
- Raised-Well
- Adjustable-Well
- Barometric-Reading
- Flowmeter Type
- Inclined-Tube

Multi-Tube Manometers
- Individual-Well
- Common-Well
- Photo-Manometers

NEW CATALOG 2008 gives details on these and other models — includes manometer liquids and accessories — explains basic principles. Write —

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Box 270 • Ann Arbor, Mich.
REPRESENTATIVES IN PRINCIPAL CITIES

Check 2995 opposite last page.

nol and naphthalene from higher boiling substituted phenols and alkylanaphthalenes.

(Hydeal® process was developed by Ashland Oil and Refining Co. and Universal Oil Products Co., but licensing details are being handled by Universal Oil Products Co., 30 Algonquin Rd., Des Plaines, Illinois.)

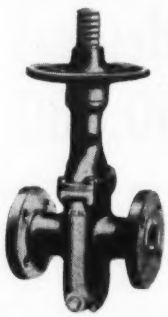
Check 2996 opposite last page.

Non-lubricated valves provide tight seal up and downstream

Uses: Gate valve applications in the petrochemical field and for general use.

Features: Provides tight seal both up and downstream, but requires no lubrication.

Description: Gate valves, available in sizes from 2 through 12", accommodate pressure ranges in ASA 150- (275 cwp) and 300-lb (720 cwp) classes. Fabricated with



Simplified maintenance, tight seal both up and downstream, and automatic wear adjustment by seats are among features of pressure-sealing gate valve

cast steel body, chrome-plated steel gate, special rubber seats, and stainless steel stem, valve has neoprene-bellows stem protector, and open and close indicator.

Design provides automatic relief of excess body pressure, and full bore, through conduit.

(Pressure-sealing gate valves are product of W-K-M Division of ACF Industries, Incorporated, PO Box 2117, Houston 1, Texas.)

Check 2997 opposite last page.

KENNEDY Coke-calcining Kilns

Mountaineer Carbon Company achieves higher yields and better quality at their new Cresap, W. Va. coke-calcining plant—with a KENNEDY Kiln and KENNEDY Kiln Accessories.

Reprinted from Chemical Engineering, copyright 1958, McGraw-Hill Publishing Co., New York, N.Y.

Mountaineer averages better than 75% yield, several percentage points higher than older installations. And the coke is more uniform in density.

Mountaineer gains these advantages through close control of combustion. A single gas-fed burner in hood at discharge end of kiln generates a temperature of about 2,500 F. Flame configuration, primary and secondary air flows are all controlled carefully; seals cut leakage of unwanted air.

This close control of combustion allows some burning of cracked gases from coke bed. Yet, it prevents unwanted combustion of carbon which reduces yields in most coke calcining. Too, it produces uniform density in finished product, a direct result of uniform temperature.

Kiln is 180 ft. long and 10.5 ft. in dia. Rotating at about 1 rpm., it retains coke approximately 100 min.

KENNEDY equipment is behind the high performance record of this new plant:

- The 180′ long kiln with its bronze sleeved, self-aligning bearings, 3-tire supports and drive assembly;
- Special feed and discharge air seals which reduce air leakage and improve combustion control;
- The kiln firing hood with its extra large access doors for maintenance;
- The air cooled nose ring assembly, specially designed by KENNEDY for coke-calcining.

When you are in need of kilns—for lime, calcined coke, dead burned dolomite, cement by wet or dry process, nodulizing and agglomerating or drying—consult KENNEDY. You can be assured of quality equipment that delivers high, long-lasting performance.

KVS

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Check 2998 opposite last page.

STUBBORN LIQUID-SOLID SEPARATION PROBLEM?

2827

Remarkable progress has been made, recently, in the application of centrifugal force.

ROBERTS CENTRIFUGALS

Unhappy about the product volume which you are able to achieve? Disgruntled about product quality? Why not call in one of our application engineers and treat the problem to a new approach? We have made remarkable progress recently in the application of centrifugal force to materials hitherto considered "out-of-bounds." Chances are we will be able to achieve greater volume and higher quality for you, too.

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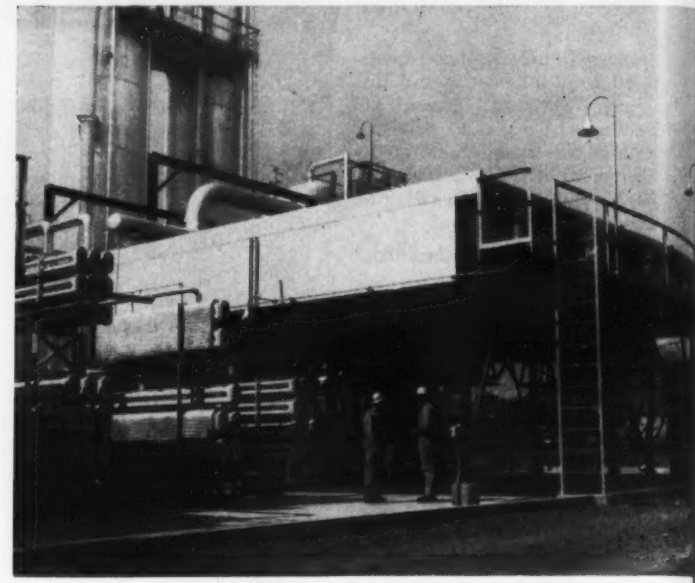
If you have no present problem, but do want the latest centrifugal information, ask for our NEW, FREE BULLETIN NO. 2827.

Check 2999 opposite last page.



Two air exchangers, with four fans, are enclosed in one housing. Another unit similar to this one is used by plant

Air-cooled condensers save plant $50,000

Eliminate need for construction of large cooling tower and auxiliary equipment

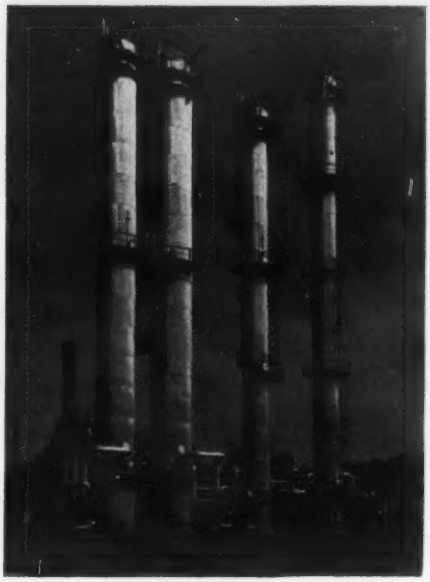
GORDON WEYERMULLER
Petrochemical Editor

Another example of the trend toward increased use of air-cooled heat exchangers is the choice of this type of equipment for overhead condensers for a multi-purpose fractionation unit recently placed on stream by Ashland Oil & Refining Company at Catlettsburg, Kentucky.

In this case, inclusion of the four air-cooled condensers provided an estimated $50,000 savings on initial cost of project. This was done through eliminating need for construction of a large cooling tower and auxiliary equipment which would have been necessary with water cooling of overhead.

In addition to the savings in capital cost, operating cost of the air condensers is less than half that of water-cooled condensers for this application. Also, selection of the air-cooling method lessens the effect of corrosion on the condenser tubes.

Four air-cooled condensers handle overhead product com-



Four towers vary in height from 117 to 140' and in diameter from 6 to 10'. Unit is capable of making cuts with a 20°F boiling range

ing from each of four towers in fractionation unit. First condenser cools 165,000 lb/hr of material from 331 to 150°F — second unit cools 133,000 lb/hr of material from 330 to 150°F — third unit cools 59,360 lb/hr from 362 to 150°F — and fourth cools 47,460 lb/hr from 345 to 150°F.

Construction of Exchangers

Each air exchanger consists essentially of a bundle of high-finned tubes placed above two large fans, one of which is a two-speed fan and the other a variable-pitch fan. Fan pitch is varied automatically to regulate air flow according to temperature of overhead being condensed. Two exchangers are enclosed in one housing as shown in left photo. Another unit similar to that in photograph is used by plant.

Tubes are bimetal, consisting of a 1" OD steel tube inside an aluminum tube. Fins ⅝" high are extruded from exterior walls of the outer aluminum tubes. Hence, fins cannot become detached because of vibration, shock or pressure variations. Ratio of outside area of tube to inside is about 17:1.

Fractionation Unit

Of the four towers in fractionation unit, three have 50 trays each and the fourth has 60 trays. Unit has an integral circulating hot-oil heating system with an output of 70 million Btu/hr.

Fractionater is designed to provide a wide range of products split from special feed stocks. Narrow cuts with a 20°F boiling range can be made. This permits production of a variety of specialty solvents.

Plant is designed to receive a feedstock input of 8400 b/d with an average production of 4000 b/d. As much as 10,000 b/d could be processed into finished products.

(Air-cooled finned condenser was manufactured by Hudson Engineering Corp., 2711 Danville St., Houston, Texas.)

Check 3000 opposite last page.

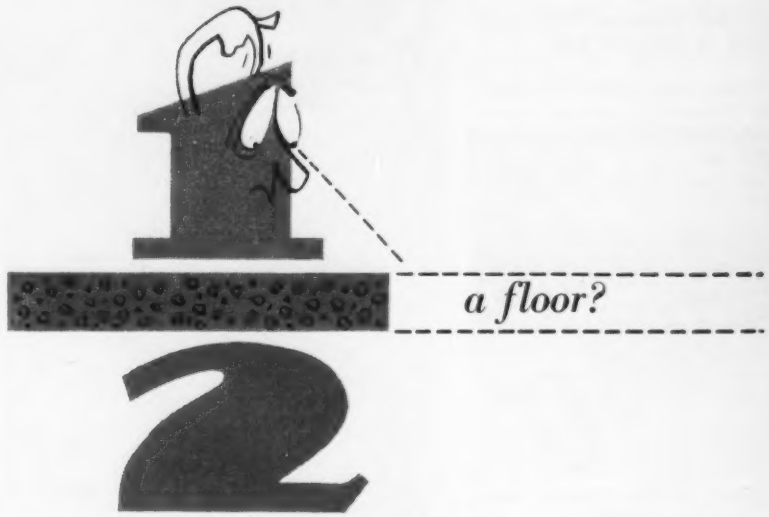
(Fractionation unit was constructed by Procon Incorporated, Des Plaines, Ill.)

Check 3001 opposite last page.

(For information on specialty solvents contact Ashland Oil & Refining Co., Ashland, Ky.)
Check 3002 opposite last page.

Why pay **FULL** *price*

for only



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Check 3003 opposite last page.

Meters viscous media without need for steam jacketing

Valve produces high vacuum to energize flow

Uses: Although it is suitable for removing viscous materials from vessels, valve can also be used to inject additives into reactors and kettles.

Valve installed beneath large reactor

Another application is for recirculation of resins in combination with a reactor for purpose of mixing. Valve can also be used for priming large rotary gear and screw pumps.

Features: Valve can dispense materials with viscosity up to 250,000 SSU with accuracy of ±2% at rates up to 2 gpm. Need for heating many high viscosity materials to cause them to flow is eliminated.

Description: Valve produces a high vacuum, causing viscous mass to collapse into vacuum pocket. This provides a constant supply in gear chamber for dispensing. Flow is linear and bubble-free and can be varied at will. Unit is manual or motor operated.

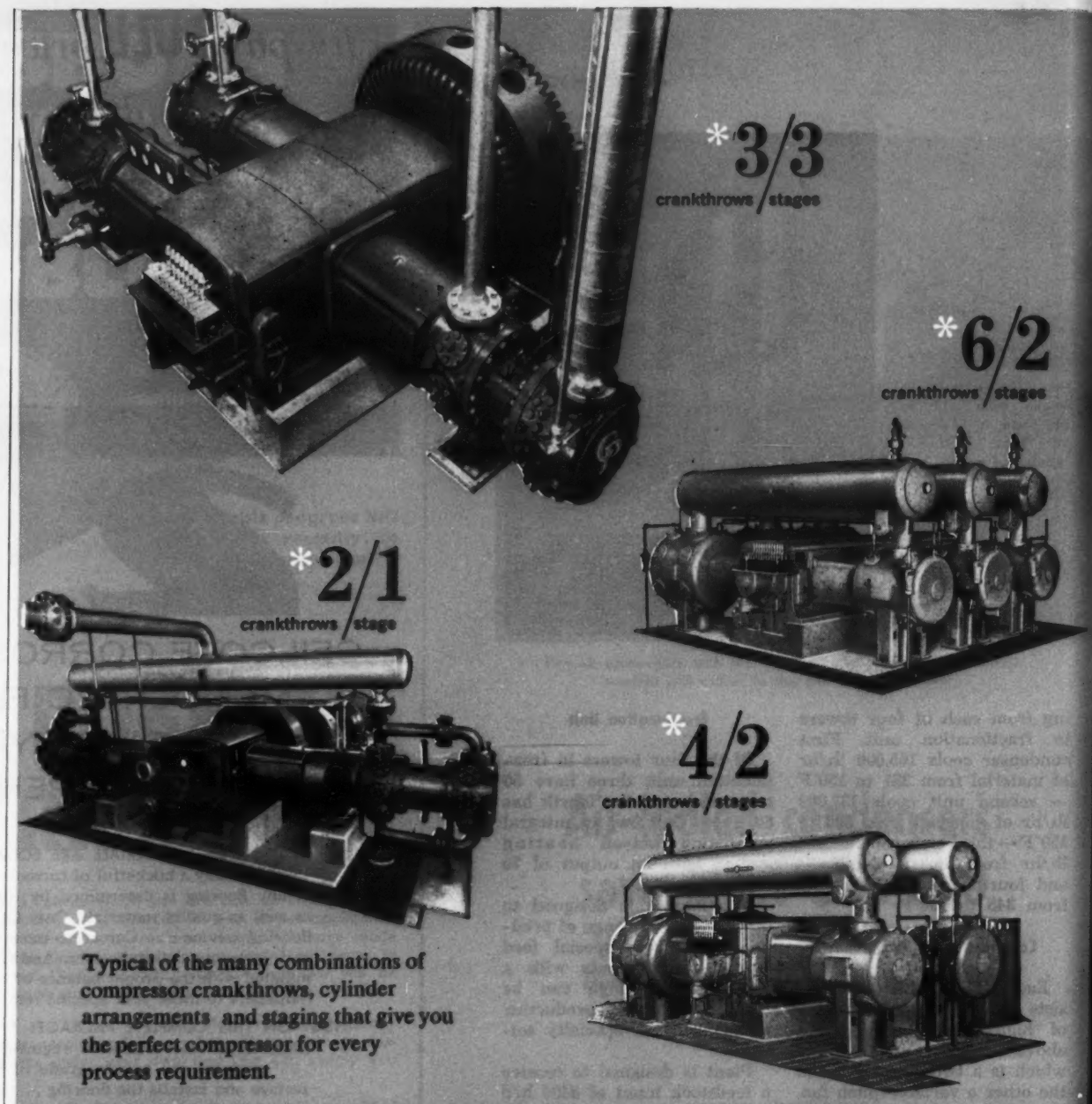
(Gear-vac valve is product of Eco Engineering Company, 12 New York Ave., Newark 1, New Jersey.)

Check 3004 opposite last page.

Valves respond to 120 cps imposed frequency

Uses: Servo control systems where ultra-high-speed response is basic requirement for valves.

Features: Valves respond to imposed frequencies as high as 120 cycles per second, and



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- *Horsepowers to 5,000*
- *From vacuum to 15,000 psig*
- *Lubricated or non-lubricated cylinders*

at its best in CLASS FE COMPRESSORS

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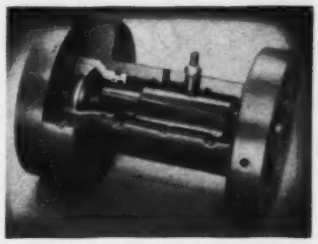
with full strokes open-closed or closed-open within 3 to 10 milliseconds.

Description: Made to order per customer's specifications, valves are available in sizes ranging from half-inch 36" mouth diameter.



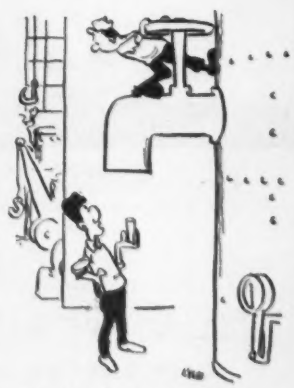
High-speed response is provided by balanced piston design

Pressure ratings range from 200 psi at 250°F to 8000 psi at 200°F. Composition of O-ring seals is only limit on operating temperatures. Models available operate under temperatures from −65 to +400°F.

Valves may be operated directly or remotely by any type of hydraulic, pneumatic or electronic automatic controllers. Visual position indicator may be adapted electrically for remote indication.

(Bendix High-Speed valves are available from Bendix Pacific Division, Bendix Aviation Corporation, 11600 Sherman Way, North Hollywood, California.)

Check 3006 opposite last page.



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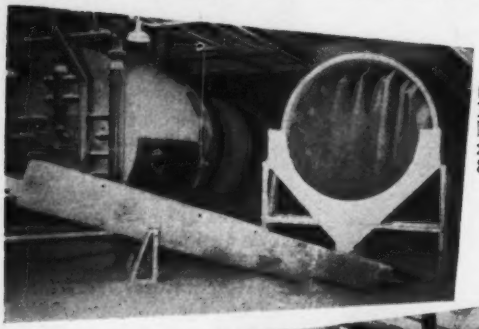
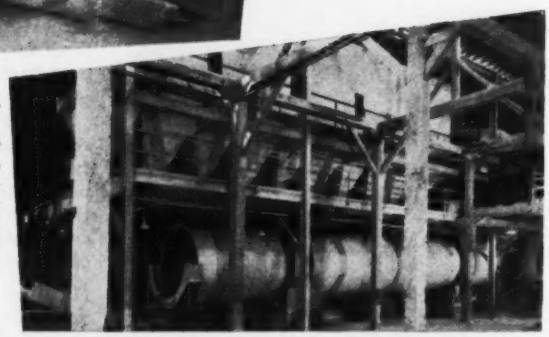
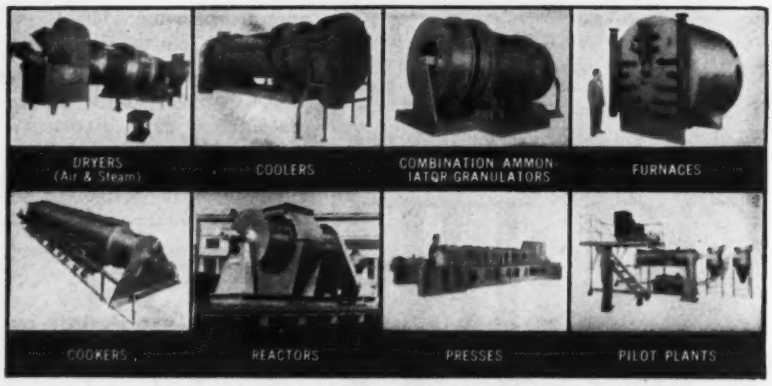


RENNEBURG 24 million BTU/Hr capacity Refractoryless Furnace—used with 8′ dia. x 60′ Dryer (left), parallel with 8′ x 60′ Counter-Current Cooler.



RENNEBURG Rotary Drying Unit (behind Counter-Current Cooler in foreground)—Equipped with 5-compartment insulated cloth-type collectors, having orlon dust tube filters for effective air pollution control.



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Literature and information on request

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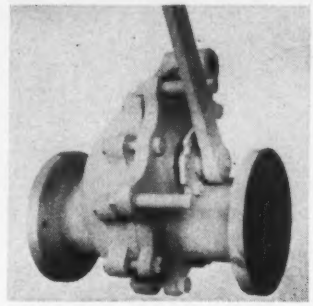
2639 BOSTON STREET, BALTIMORE 24, MD.

Check 3007 opposite last page.



Interior of gate valve shaped to minimize slurry clogging

Uses: Gate-valve applications in petroleum, chemical, and allied industries.

Features: Problem of slurry material clogging chamber is minimized by shape of valve interior. Sloping sides of valve disc cause recirculation of slurry material in body chamber when valve is operated.

Description: Stops which arrest travel of operating handle are located outside, eliminating a cause of interference with free flow of material. When valve is operated by air cylinder, piston of latter acts as stops.

Purge holes are provided for flushing with air, steam, or water under pressure if material does accumulate or pack up.

Valve, which may be obtained in iron, steel, brass, or stainless steel depending on service required, is offered in four-inch size with iron body, lever operated.

In some instances, edge of disc and seat face around post can be hard-faced to cut through material in transit.

(Gate valve is manufactured by Everlasting Valve Company, 49 Fisk St., Jersey City 5, New Jersey.)

Check 3008 opposite last page.

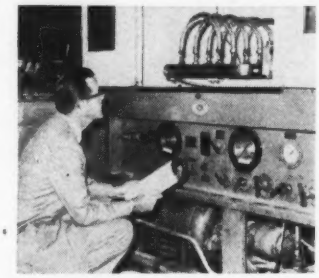
Hose remains flexible at −450°F

Can withstand pressures above 4500 psi

Recent technical paper presented information on RF-69 hydraulic hose which remains serviceable and flexible at temperatures down to −450° F. Hose is suitable for a variety of cryogenic applications in chemical processing operations.

Temperatures up to 1200°F are also resisted by the hose. It passed impulse loading tests at pressures 4500 psi with endurance life in excess of 100,000 cycles.

Three-ply corrugated hose has inner and outer plies made of stainless steel and a middle ply of a metal of high damping capacity, such as copper. Entire hose is encased in stainless steel braid. It has been made in sizes from ¼ to 1¼", with sizes up to 2" being planned.



Checking pressure readings while testing multi-metal hydraulic hose

(Condensed from technical paper, "Flexible Hose for Hydraulic Systems," which was presented at the National Conference on Industrial Hydraulics held in Chicago in October 1959. Paper was prepared by D. Wendell Fentress, Vice-president, Research and Development, Flexonics Corporation, 1319 S. 3rd St., Maywood, Ill.)

Check 3009 opposite last page.

Titanium-clad vessel in petrochemical plant gives good service

A development that may lead to much wider use of titanium in chemical, petrochemical, paper and other processing fields is the announcement of the successful use of a titanium-clad pressure vessel. Vessel has withstood many months of strenuous service in a petrochemi-

cal plant on the West Coast. This is the world's first titanium-clad pressure vessel of commercial size as far as is known.

Use of titanium-clad enables a plant to utilize the corrosion resistance of titanium at less cost than if solid titanium were used. When the thickness of a titanium vessel exceeds 5/16", the clad becomes more economical. Also, carbon steel attachments can be made to the outside of a clad vessel whereas this is not possible if vessel is solid titanium.

Titanium-clad vessel installed in California was designed for a working pressure of 150 psi at 500°F. It measures approximately 4' in diameter by 12' high and is fabricated from plates of ½" mild steel clad with 5/64" and 7/64" Grade A-40 titanium. Hemispherical heads, top and bottom, were welded from pressed segments. Fittings and flanges were titanium-lined.

Considerable research work was done on welding techniques to be used on vessel. Procedures were developed to

Titanium-clad vessel is 12' high and 4' wide

prevent contamination of the titanium cladding by the steel backing plate. Forming problems were solved. Ways were found to vacuum-clad in titanium at sheet sizes comparable to sheets of conventional corrosion-resisting metals. Clad sheets up to 5' by 7' were used on vessel.

(Titanium Hortonclad vessel was built by Chicago Bridge & Iron Company, 332 S. Michigan Ave., Chicago 4, Ill.)

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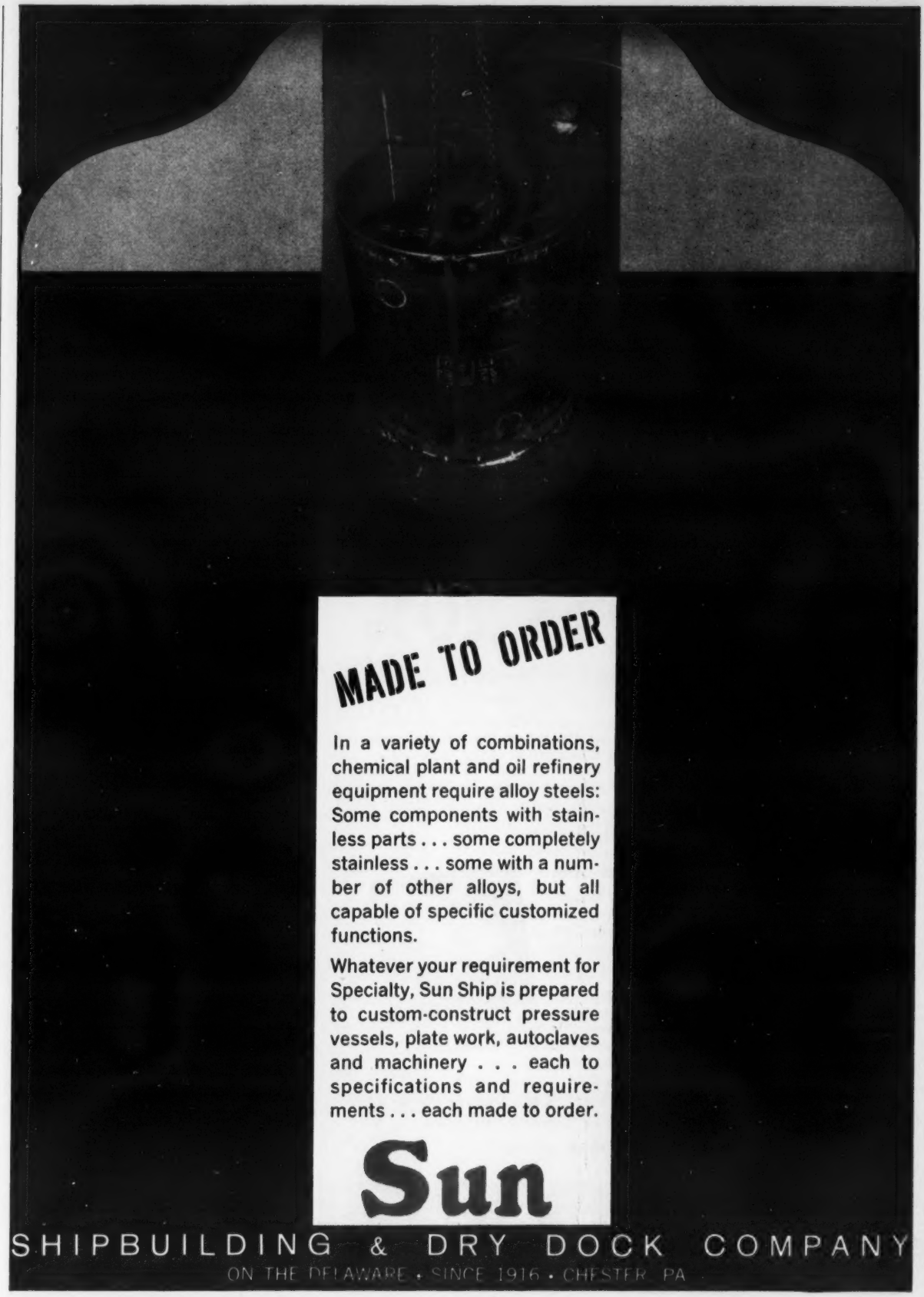
MADE TO ORDER
In a variety of combinations, chemical plant and oil refinery equipment require alloy steels: Some components with stainless parts . . . some completely stainless . . . some with a number of other alloys, but all capable of specific customized functions.
Whatever your requirement for Specialty, Sun Ship is prepared to custom-construct pressure vessels, plate work, autoclaves and machinery . . . each to specifications and requirements . . . each made to order.
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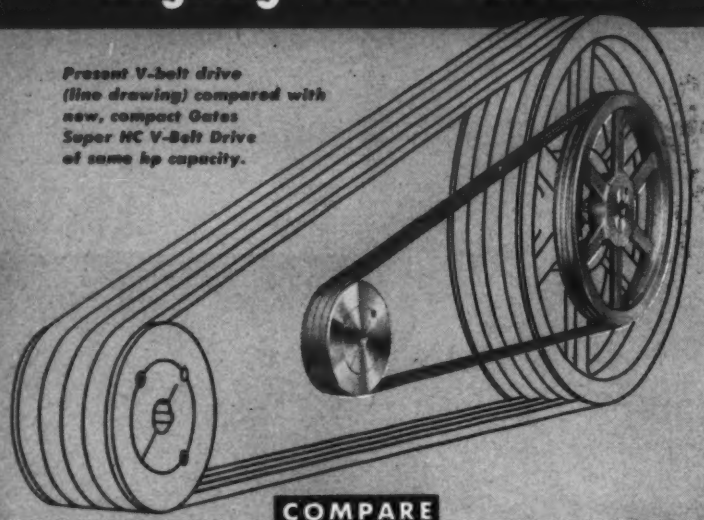
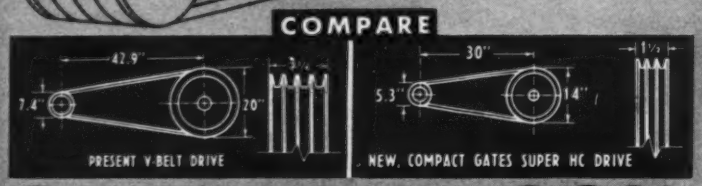
Check 3011 opposite last page.

Designing NEW DRIVES?





Save up to 20%

with new high capacity V-belt drive

When you change the whole drive — both V-belts and sheaves — remember: The cost of a Gates Super HC V-Belt Drive is as much as 20% less than the cost of present V-belt drives of the same horsepower capacity.

A development of Specialized Research in the world's largest V-belt laboratories at Gates, the new Super HC V-Belt makes possible the most compact, lightest-weight, lowest-cost multiple V-belt drive you can put on any machine!

Cuts drive space as much as 50%

With Gates new Super HC V-Belt, sheave diameters and widths can be reduced 30% to 50%, center distances 20% and more. Bearing load is lightened and total space occupied by the drive may be cut as much as 50%.

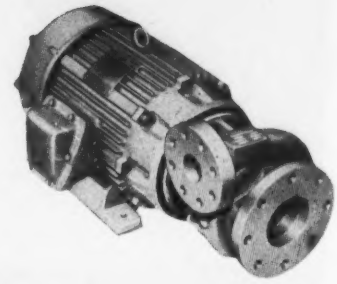
"The Modern Way to Design Multiple V-Belt Drives" is an informative handbook on the Super HC Drive, available from your nearby Gates Distributor listed in the Yellow Pages of your phone book.

The Gates Rubber Co., Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ont.
World's Largest Maker of V-Belts

TPA 439

Gates SUPER HC V-BELT Drives

Check 3012 opposite last page.



Minimum wet-end weight cuts cool-down time of transfer pump

Uses: High-flow continuous or intermittent petrochemical and cryogenic transfer-pumping duty.

Features: For cryogenic applications, minimum wet-end weight reduces cool-down time and minimizes loss of liquid. Open construction between pump and built-on electric-motor drive reduces hazardous collection of gas in pump area.

Description: Family of pumps has capacity range from 10 to 8000 gpm with differential pressures up to 300 psi outlet. Units operate at low values of net positive suction head without adversely affecting performance.

Supplied close-coupled to electric-motor drive, complete range of separate bearing housings permits direct coupling to other drives such as steam or gas turbines, and hydraulic motors.

Thermal barrier between pump and motor minimizes heat transfer. In addition to conventional seal or packing, pumps may be furnished with all-metal Series AMB shaft bellows seal for severe environments.

(Series 3000 transfer pumps are produced by Turbocraft, Inc., 492 E. Union St., Pasadena, Calif.)

Check 3013 opposite last page.

NEXT MONTH

The booming Japanese petrochemical development will be discussed in a feature article written by Taydayoshi Kitamura, President, Asahi-Dow Limited.

Steam, catalytic cracking yield nine feed stocks for butadiene

Two extraction lines used in feed preparation

Economical butadiene production from petroleum by dehydrogenation, at Japan Synthetic Rubber Company's plant at Yokkaichi, is proving to be key to domestic production of synthetic cold rubber in that country.

Charge stocks in process are butane and butane-butylene streams from petroleum refineries. Selection of feed stock to dehydrogenation unit was based on greatest production of butadiene per unit of charge. Feed-stock order of selection is as follows:

1) **Butane-butylene by-product fractions from steam cracking for ethylene production.** These C_4 fractions contain approximately 38% butadiene and 32% n-butylenes. After extraction of butadiene, remaining C_4's represent excellent raw feed for dehydrogenation to butadiene.
2) **Butane fractions from catalytic cracking.** These contain high ratio of n-butylene, but also have considerable quantities of iso C_4's, which must be removed before feed is acceptable for dehydrogenation to butadiene.
3) **Butane fractions from crude topping, catalytic reforming and alkylation plants.** These are mixtures of isobutane and n-butane. They require de-isobutanization since only n-butane is directly convertible to butadiene.

The C_4 stream from steam cracking, together with recycle from copolymer plant, is fed to de-oiler where pentane and heavier components are rejected as liquid which may be utilized as fuel. Overhead from de-oiler, containing mixed C_4's including butadiene and mixed C_3's, is then depropanized in separate column. Bottoms from de-

propanizer are then passed through absorption section of solvent-extraction unit.

Unabsorbed material, consisting of mixed C_4's minus butadiene, together with mixed C_4's from catalytic cracking, are passed to splitter column. This is precise fractionation column. It is designed to split out iso C_4 compounds with minimum carryover in overhead of butadiene formers, other than butylene-1 which boils in same range as isobutylene.

Overhead consists predominantly of isobutane, isobutylene and butylene-1. Bottoms, constituting portion of fresh feed to dehydrogenation unit, are mainly butylene-2 and butane.

Remaining fresh feed required is obtained by simple de-isobutanization of stocks containing isobutane and normal butane. Isobutane and small amounts of normal butane make up the overhead product and are available for use as LPG or fuel. Bottoms of tower are n-butane and constitute remainder of required feed stock to dehydrogenation plant.

(Dehydrogenation process is licensed by Houdry Process Corporation, 1528 Walnut St., Philadelphia 2, Pa.)

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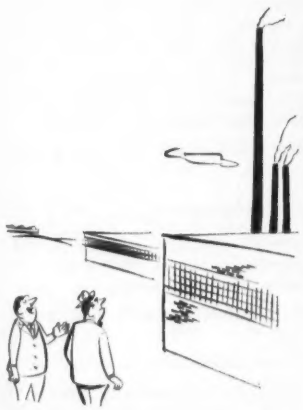
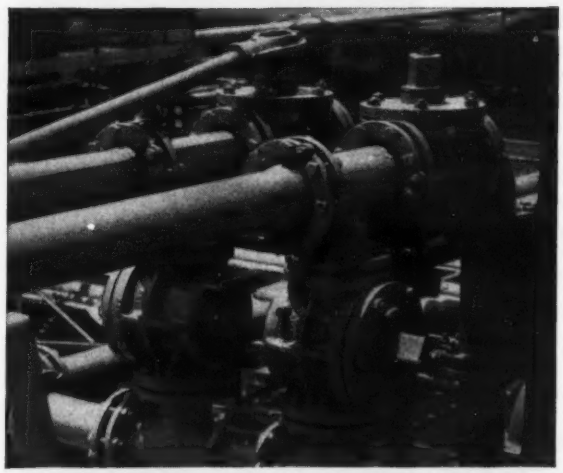


"The extra length filters the smoke."

Goodyear specifies Homestead Valves for non-contamination of GR-S latex rubber



Homestead lubricated plug valves handling latex rubber.

Through the round ports of Homestead Lubricated Plug Valves at Goodyear Tire and Rubber Company's synthetic rubber plant in Houston, Texas, flow dilute solutions of GR-S latex rubber at 80 p.s.i. and 100° F.

Fluid solutions never lodge and build up in the line since Homestead Round Port Valves provide full circular opening through plug and body of the valve—same size as the pipe they serve.

Controlled pressurized lubrication plus extremely close tolerances between plug and body assure lubrication of all sealing surfaces without contamination of line fluids.

Write for complete details on low first cost, low maintenance, Homestead Valves in our catalog 39-1.

140

☐ Please send me catalog and prices on Homestead Lubricated Plug Valves.

Name.....Title.....

Company.....

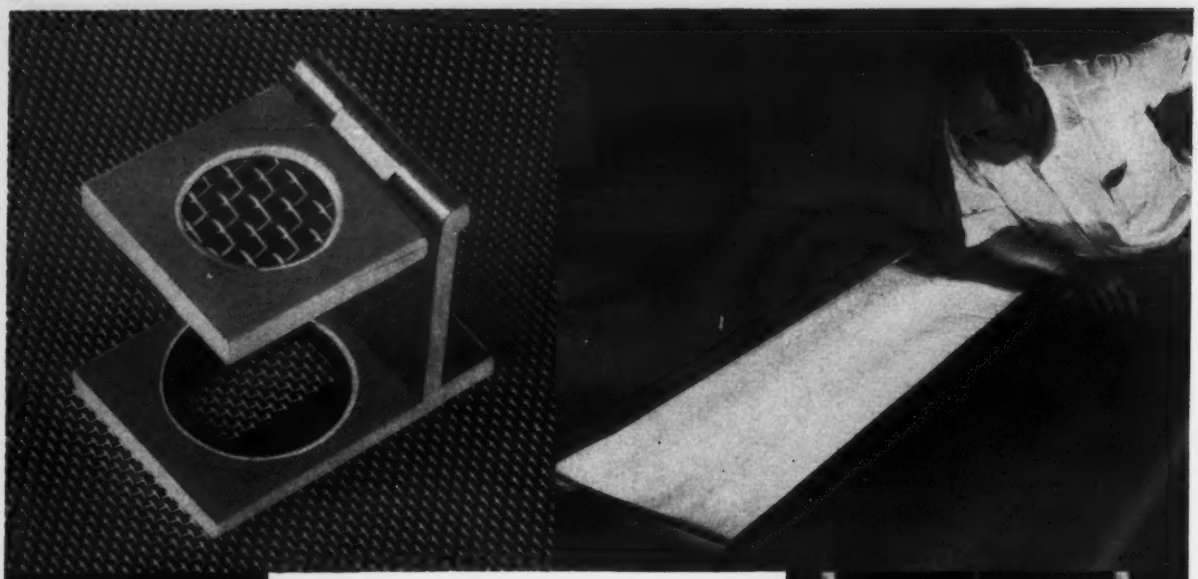
Address.....

City.....Zone.....State.....

hv

HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 140, Coraopolis, Pennsylvania

Check 3015 opposite last page.



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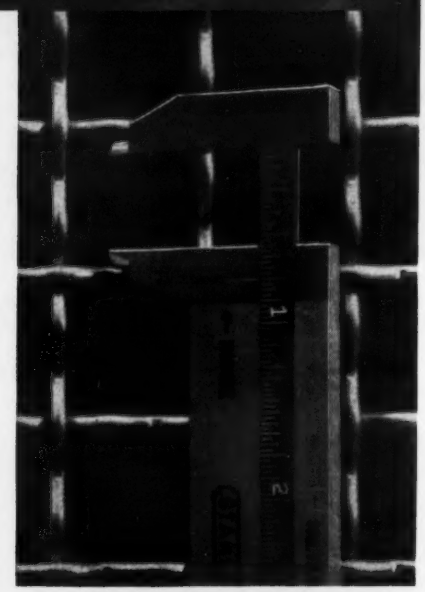
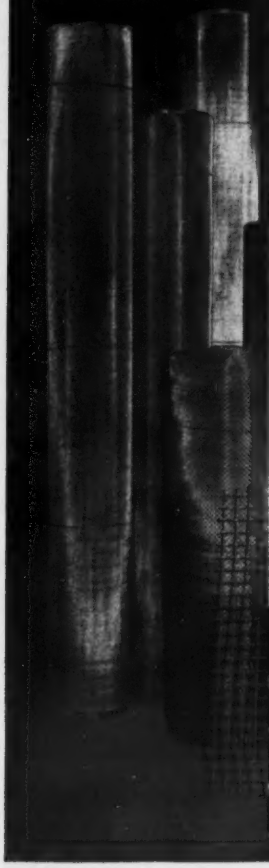
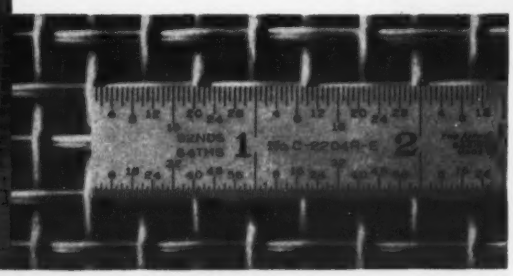
Manufacturers of Wire Cloth, Metal-Mesh Conveyor Belts, Wire Cloth Fabrications







Check 3016 opposite last page.

NEW LITERATURE

Petrochemicals

Fluid power equipment of a variety of different types for use in the chemical processing and other industries is discussed in 16-page Bul 10051-H. — The Oilgear Company.

Check 3017 opposite last page.

Rotary jet for cleaning the inside of tanks, tankcars and tank trucks is described in Bul 432 — Sellers Injector Corporation.

Check 3018 opposite last page.

Speed reducers are covered in 65-page catalog. Engineering data, dimensions and application charts on the fan-cooled reducers are included. "Hi-Line" speed reducers — The Ohio Gear Company.

Check 3019 opposite last page.

Compressors of single-stage scroll casing type are discussed in 12-page bulletin. Three different styles manufactured are described. Bul 16B6048C — Allis-Chalmers Manufacturing Company.

Check 3020 opposite last page.

Data processing equipment, including digital data processing and analog and digital computing systems, are discussed in 48-page publication. Operation in the petrochemical field is described. Pub N-07(1) — Leeds & Northrup Co.

Check 3021 opposite last page.

Pressure reducing valves suitable for pressures to 900 psi and temperatures to 750°F are described in four-page bulletin. Section 1 — Atlas Valve Co.

Check 3022 opposite last page.

Instrument drive and timing unit, powered by air or gas, which is suitable for remote location installations, such as gas gathering systems, is covered in Bul 1107 — Meter and Valve Division, Rockwell Manufacturing Company.

Check 3023 opposite last page.

Level transmitters are discussed in four-page bulletin. A simplified diagram illustrates operation of reset booster relay. Bul P31-1 — Bailey Meter Company.

Check 3024 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Elimination of electricity cuts maintenance on rotary packer

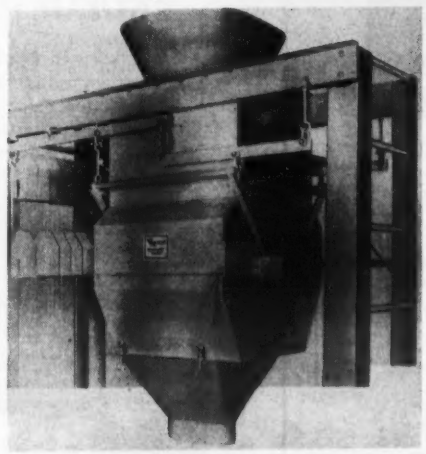
Gravity-operated unit fills 50-lb multiwall bags in fertilizer plant at rate of 23-25/min with accuracy of ±3 or 4 oz

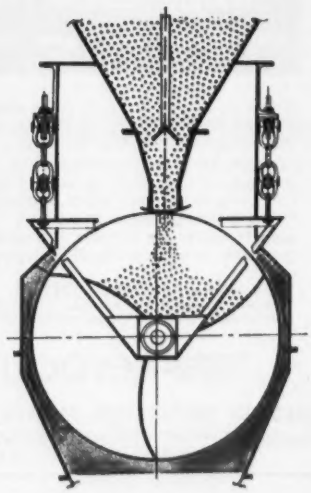
GORDON WEYERMULLER, Associate Editor
with **RALPH V. MIDDAUGH,** Plant Superintendent
Indiana Farm Bureau Cooperative Ass'n., Inc.
Indianapolis, Indiana

Granular fertilizer being fed to chute of gravity packer at Indiana Farm Bureau. Note scale mechanism in lower portion of photo
CP Staff Photo

Operator prepares to hold bag under spout of rotary hopper
CP Staff Photo

Overall view of mounted rotary packer





After upper compartment of rotary hopper fills to required weight, scale trips. Hopper then revolves and unloads material into spout

One of the chief advantages found for recently developed bag packer operating in the Indianapolis plant of Indiana Farm Bureau is the absence of electricity or air for motivation. Based on experience with other equipment, this plant feels that this is the major reason for the very small amount of maintenance that has been needed on unit.

At this plant packer is used for filling open-mouth bags with granular fertilizers. Product is delivered to chute of packer on a conveyor belt. Packer automatically weighs and delivers 50 lb to bag, which is held under spout by operator, and then passed on to sewing machine by moving conveyor belt.

The sewing machine has been found to be the governing factor in speed of operation. About 23-25 bags/min are filled on an extended run. Accuracy is within ±3 or 4 oz. Packer is operated in two shifts. While in operation, packer need not run continuously to maintain accuracy.

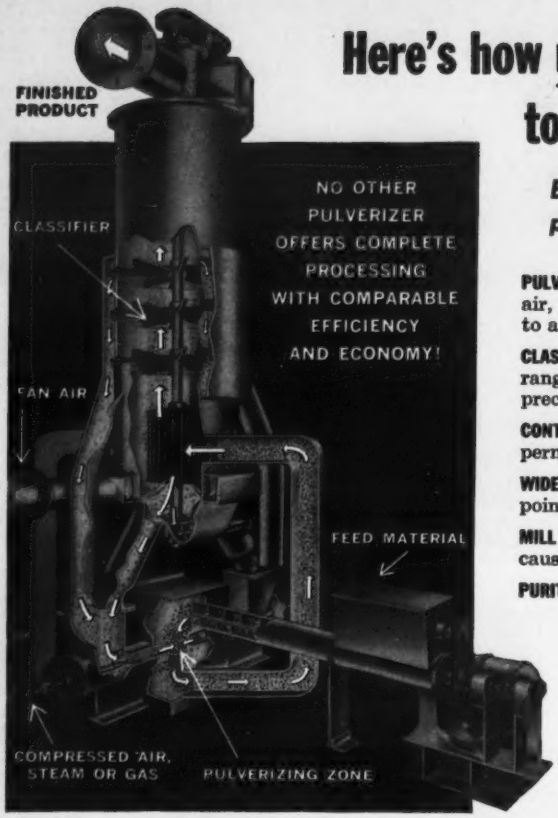
Packer, which is 100% mechanical, is operated by gravity. Neither electricity nor compressed air is needed for operation. Material from supply chute is fed to rotary hopper, which has three compartments. Rotary hopper is suspended from even-balance scale assembly.

As soon as one compartment of rotary hopper fills to required weight, scale trips rotary hopper, which then revolves and dumps material into spout. At same time next compartment is filling to required weight. Operator holds bag under spout for filling. Cycle is repeated at regular intervals.

Packer is shipped assembled ready for installation. It requires minimum headroom of 10'3". Unit will handle 50- to 100-lb bags. Change in weight to be packed can be made in 60 seconds. Bearings are dustproof, oiled, and permanently sealed. Packer is made of heavy gage carbon steel. It can be furnished in stainless or other materials as required.

(Rotomatic packer is sold by Raymond Bag Corporation, Div. of Albermarle Mfg. Co., Middletown, Ohio.)

Check 3025 opposite last page.



Here's how unique MAJAC Jet Principle works to improve Pulverizing Process!

Economy and efficiency of exclusive Jet-Stream collision process unmatched by any other pulverizer!

PULVERIZES by collision of particles in high velocity jet streams of air, steam, or gas. Produces particle sizes as coarse as ⅛" down to a top size of a few microns.

CLASSIFIES with unusual efficiency and accuracy within a broad range of variable settings. Classifier integral but separately and precisely controlled.

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WIDE RANGE OF MATERIALS can be handled from soft low-melting point organics to hardest abrasive materials.

MILL WEAR and maintenance are reduced to absolute minimum because particles collide with each other instead of wearing mill.

PURITY is maintained at highest level because of minimum mill wear.

Sizes available for lab, pilot plant and production use.

Write today for detailed information or visit by qualified Majac representative.

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Designers and manufacturers of pulverizing, classifying and separating equipment for industry.

Check 3026 opposite last page.

Conveying Corrosive Chemicals?

SOLVE THEM WITH

Aeroquip Flexible Hose of Teflon

and Reusable "*super gem*" Fittings*

Chemicals, solvents and other fluids which deteriorate ordinary hose or tubing can be handled safely with Aeroquip 2802 Hose of Teflon. It is chemically inert and stable, has excellent lubricity, withstands temperatures from -65°F. to 500°F. Long, trouble-free performance, even under constant hose line flexing is assured. Corrosion-resistant "*super-gem*" Fittings are reusable. Call your Aeroquip Distributor, or write for IEB-40 for details.

*U.S. Patent Nos. 2,833,567 and 2,731,279.
"*super gem*" is an Aeroquip Trademark
Teflon is DuPont's trade name for its tetrafluoroethylene resin

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Check 3027 opposite last page.

NEW! BLACKMER VARI-FLO PUMPS and PROPORTIONING SYSTEMS

You'll benefit from new economy and efficiency with Blackmer rotary Vari-Flo Pumps and Proportioning Systems for stream blending of liquids or transferring liquids at varying flow rates from the same pump. Eliminates the need for variable-speed motors, makes old-fashioned batch blending cumbersome and obsolete, saves costs and adds efficiency to a variety of processes.

FREE CATALOG!

Write for free Vari-Flo Pump Bulletin No. 600

"liquid materials handling"® equipment

BLACKMER PUMP COMPANY

Grand Rapids 9, Michigan

Check 3028 opposite last page.

Low cost and long life for polyethylene drum in wirebound jacket

Returnable shipper made in four sizes to 55 gal

Uses: Shipment of liquids of the chemical, food, drug and paint industries. Containers have passed MCA-ICC tests for regulated liquids, and may be shipped under permit with "any liquid safe in polyethylene," including corrosive, toxic and flammable products.

Features: Initial cost is reported as 40-65% less than for conventional container for the same service. Service life is estimated to be 50% longer than with these conventional containers.

One way of handling 30-gal composite returnable drum. The 55-gal size has built-in pallet base to take forks of conventional lift trucks

Description: Returnable composite shipping containers are available in five-, 15-, 30- and 55-gal sizes. Inner rigid polyethylene drum, molded in one piece, is surrounded by wirebound wooden octagonal drum (rectangular for five-gal size). Double-dipped galvanized steel binding wires and staples are used for corrosion resistance. Closure flanges, threaded for 2" and ¾" polyethylene drum plugs, protrude through recessed "head" of the wirebound container.

Containers are highly durable and can be stacked at least 60' high. In fact, the 15-gal size could be stacked 150' high if this were practical.

Wirebound outer pack was designed by Package Re-

search Laboratory, Rockaway, N. J.

The composite container will be supplied as an assembled unit, where desired. Or, user can purchase the inner polyethylene drum and outer wirebound box separately, and do the assembly of the composite himself. The 30-gal size can be put together in one man-minute.

(For more information on this wirebound composite container, contact Delaware Barrel & Drum Company, Inc., Wilmington 99, Del.)

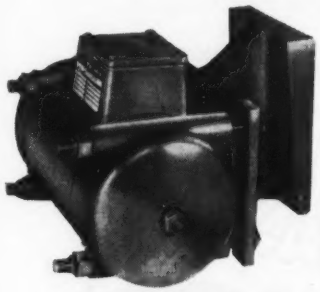
Check 3029 opposite last page.

High impact/weight ratio identifies vibrator

Eccentrics are adjustable to suit application

Uses: External vibration of bins, hoppers, chutes, jolters, classifiers, screens.

Features: High impact-energy/weight ratio: the three models, weighing 30, 40, and 60 lb, give impacts ranging



Vibrator is totally enclosed

from 500 to 1400 lb. Eccentric weights can be adjusted for different applications.

Description: Totally enclosed, self-contained unit is ready for permanent or temporary attachment. Standard models deliver 3600 vibrations/minute from 60-cy AC. Vibrations are transferred in straight line from eccentrics to object to which unit is attached.

(Tremix external vibrator was developed by B. W. Elliott Manufacturing Co., Inc., Binghamton, N.Y.)

Check 3030 opposite last page.

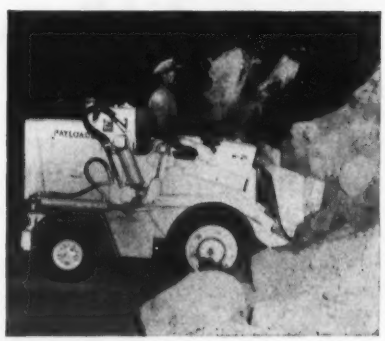
All these PROTECTIVE features are a part of the H-25 PAYLOADER®

"The more than 10,000 small 'PAYLOADER' tractor-shovels that we have produced for steel mills, foundries, chemical and fertilizer plants usually operate under exposure to dust, dirt, powder and foreign materials," says Ralph Beyerstedt, Executive Vice-President of The Frank G. Hough Co.

"During the development of the H-25, as soon as it became evident that we were going to obtain the increased capacity, production, operating ease, speed and mobility we sought, our engineers then gave major attention to *protective features* for operational insurance against wear, maintenance delays, abuse, downtime and the like."

Dozens of Protective Features

"We started by giving the engine maximum protection with a triple air cleaning system, cartridge-type oil filter, sealed ignition and starter switches, a 12-volt electric system with sealed generator, solder coated terminals and a clutch-pressure warning device. The filtered hydraulic system is closed and pressure controlled and the majority of all major pivot points in the boom arm mechanism, the gearshift and steering linkage are sealed."



What About H-25 Production?

"Most important of all, the operating capacity of the H-25 is 2,500 lbs. — 25% greater than has ever before been available in a tractor-shovel of its size and maneuverability. It is the only loader in its size range with *complete* powershift transmission — having 2 speed ranges forward and 2 in reverse. Power steering also is standard.

"Other plus features of the H-25 that mean more production, long life and less maintenance are the exclusive power-transfer differential, wet-sleeve overhead valve engine, 4,500 lbs. of bucket breakout force and 40° bucket tip back at ground level."

Your "PAYLOADER" Distributor wants to show you how the greater capacity, easier handling and more fully protected H-25 can cut your bulk handling costs.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
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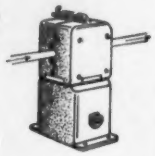
Check 3031 opposite last page.

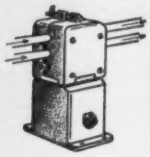
PUMPING IDEAS

POSSIBLE ONLY with a SIGMAMOTOR PUMP

MOVE CORROSIVE LIQUIDS

Material being pumped never comes in contact with pump mechanism. Wave-like motion of steel fingers forces material through Tygon tubing. By changing size of tubing, capacity can be increased or decreased. Pump housing opens for removal and insertion of tubing.



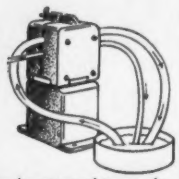


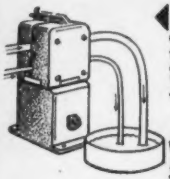
PUMP 2 OR 3 DIFFERENT LIQUIDS SIMULTANEOUSLY

Some models will accommodate up to four tubes so that four different liquids can be passed through the pump at one time without danger of contamination.

FEED AND MIX

One or more tubes can be feeding material to a mix while a larger tube is recirculating the liquid to produce agitation and thorough mixing. Viscous materials can be pumped without danger of gumming or plugging. Remove tube and pump is clean.





METER ADDITIVES

One or more additives can be pumped to a solution in the exact amount desired by selecting the correct size of tubing and regulating pump speed. Various controls can be incorporated to close valves ahead of pump.

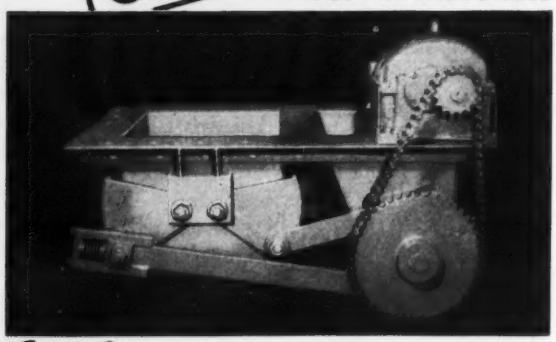
Capacities from 0.5 cc. per min. to 4.5 G.P.M.

Write for complete information on sizes and capacities.

SIGMAMOTOR, INC.
18 N. Main Street • Middleport, N. Y.

Check 3032 opposite last page.

Bin GATES! All Types All Sizes ...For All Materials



Webster DUPLEX Gate

Motor-operated, this positive-acting gate can be supplied with remote control. Regularly made of steel, the Webster DUPLEX Gate can also be furnished with cast iron housing and gate leaves—or cast side gate leaf panels with renewable steel gate bottom plates.
Webster also manufactures a complete line of Drip and Sift Proof Gates; Dust Proof Rack and Pinion Gates; Simplex, Undercut and Slide Gates; and Rotary Cutoff Valves for all industries.
Write us—outlining your requirements.

Webster MANUFACTURING, INC.
DEPT. C-10 TIFFIN, OHIO
BULK MATERIALS HANDLING EQUIPMENT
Offices in all Principal Cities

Check 3033 opposite last page.

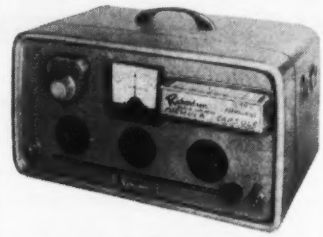
HANDLING & PACKAGING

Preset 'formula capsule' skirts human error in proportioning

Controls sequence, weighing of up to 24 ingredients

Uses: Programs sequence and weighing of up to 24 solid and/or liquid ingredients in blending, proportioning and batching operations. Plugs into manufacturer's Select-O-Weigh, a system of electrical controls which operate the various feeders, scales, conveyors, mixers and other equipment of the process.

Features: Amount of each ingredient in formula is preset or reset by simple setscrew adjustment. This rules out the possibility of human error causing material waste or non-uniform batches.



This portable "formulator" can be used to preset formulas on formula capsule (plugged in at upper right front of unit)

Description: Pocket-size "formula capsule" consists of a network of miniature electronic components sealed in a shatter-proof protective cover. Removable card, under transparent cover on top of unit so as to be always visible, identifies formula and components.

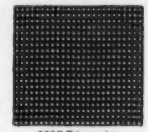
Formula can be preset by a portable "formulator" (shown), or by plugging capsule into panel of Select-O-Weigh and using its system. Using the formulator, the formula capsule is inserted in slot, desired weight of each ingredient is set one after another on dial, and for each the capsule setscrew is turned until dial on meter is brought into balance.

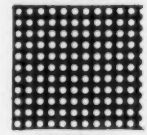
(Formula capsule is development of Richardson Scale Company, Van Houten Ave., Clifton, N. J.)

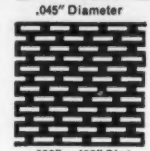
Check 3034 opposite last page.

The Right PATTERN
The Right OPEN AREA
The Right MATERIAL
FOR EVERY SCREENING REQUIREMENT

H&K PERFORATED SCREENS


.020" Diameter


.045" Diameter

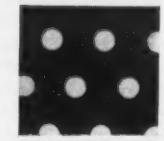

.028" x .125" Slot

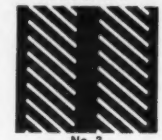
Just a few of the many H&K patterns are illustrated

For grading, sieving, dewatering, filtering, straining—when you want a screen "just right" for the job—you can depend on H & K.

H & K screens are made to your order, with holes accurate and uniform in size, shape and spacing. Burr-free holes are slightly larger at bottom—reduce blinding, save on down time. Margins and unperforated areas are furnished as specified.

Screens are made in practically any material desired... including plastic. H & K specializes in perforating stainless steel, monel and other corrosion-resistant alloys. Let us work with you on your screening requirements.


Tapered Round Holes in Steel


No. 3 Diagonal Slot

FIND NEAREST H&K AGENT in the 'Yellow Pages'
Listed Under "Perforated Metals"

Write for H & K General Catalog

THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse
5636 Fillmore St., Chicago 44

New York Office and Warehouse
110 Liberty St., New York, N. Y.

Check 3035 opposite last page.

need more information...

Note there is a key number at the end of editorial articles or advertisements. To request more information check the proper number on the convenient form opposite the last page. Send the form to us . . . we do the rest. Information comes direct to you. No obligation, of course

Polyethylene bottles being filled (background) and capped (foreground) at Philip A. Hunt Company

Shatterproof gallon plastic bottle cuts shipping weight 23%

This saving alone more than offsets higher price for the attractive, printed polyethylene container used here for photographic chemicals

Problem: Handling and shipping breakage averaged two percent in using glass industrial containers for packaging photographic acidic stop baths and hardener solutions as Philip A. Hunt Company, Palisades Park, N. J. This despite careful padding of the corrugated reshipper cartons which held four one-gallon bottles of solution.

The containers posed a disposal problem to hospital X-ray processing labs, large customers of Hunt. Broken glass is feared in such institutions, so handling and discard had to be done with extreme care.

Solution: In June 1959, the company switched to a shatterproof, one-gallon, modified square polyethylene container for these solutions. Having a wall thickness of 0.009-0.017", the bottle is made

Back into reshipper cartons go the now filled bottles of photographic solutions

PROPELLAIR®
Ventilating Equipment

Electronic speed test in Propellair's wind tunnel

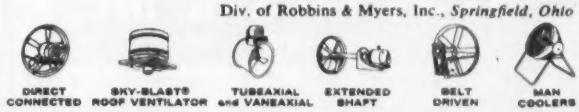
FOR RUGGED DUTY... NEW design axial fans *in sizes up to 60 inches!*

Move corrosive or explosive fumes, extreme heat or high humidity with new PROPELLAIR Type BT belt driven axial fans. They feature heavy 10 and 12-gage drums . . . isolated, air-cooled, protected bearings and belts . . . airfoil propellers cast of hi-strength aluminum-magnesium alloy . . . Robbins & Myers *"All-Weather"* motors for a single nameplate guarantee on the complete unit.

Hi-pressure, big hub propellers are available for those tough applications developing high resistance.

Send today for complete information on this modern, efficient fan. Ask for Bulletin 620—CP

PROPELLAIR®
Div. of Robbins & Myers, Inc., *Springfield, Ohio*



MOVING AIR IS OUR BUSINESS®

Check 3036 opposite last page.

UNMATCHED DRYING QUALITY

ROCKWELL OVENS

Bench, Cabinet, Truck and Conveyor Types

ELECTRIC • GAS • STEAM

Convection heating for fast, uniform heat processing

Cabinet type gas oven with slotted door for removal of individual trays.

Get Bulletin 127

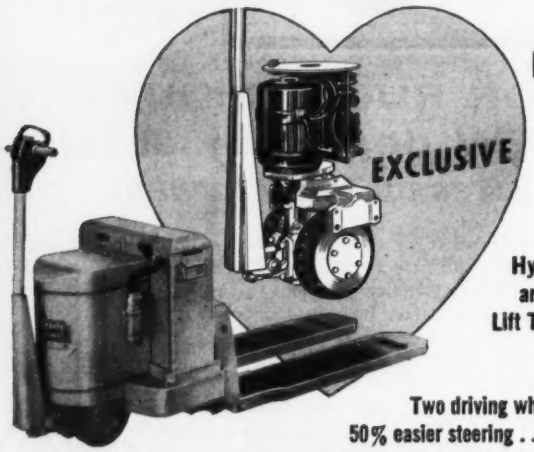
Electric oven with belt conveyor and feed hopper.

Truck type, indirect gas-heated oven.

W. S. ROCKWELL COMPANY 2200 ELIOT STREET FAIRFIELD, CONN.

Check 3037 opposite last page.

HEART OF THE HydroLectric



. . . THE DYNA-DUAL POWER UNIT

Compare the Hydrolectric features with any other "Driver Lead" Lift Truck. The Hydrolectric quality of construction merits your inquiry.

Two driving wheels instead of one . . . 50% easier steering . . . ease of maintenance.

NOTE: The Dyna-Dual Power Unit is interchangeable on all models.

A TRUCK FOR EVERY PURPOSE AND MATERIAL

LIFT TRUCKS, INC.
CINCINNATI 14, OHIO

Check 3038 opposite last page.

of high-density or linear polyethylene.

Hunt gets its plastic containers, silk-screen-printed in red and black, in printed reshipper cartons. They are filled six at a time on a semi-automatic MRM unit that has been converted from vacuum feed to gravity feed to accommodate the pliable plastic bottles.

Results: Breakage is now next to nothing. Hospitals can breathe easier when handling and discarding the new container.

Cost Comparisons

Four plastic bottles in a reshipper cost slightly more than the equivalent glass containers. However, the plastic bottles are attractively printed; the glass bottles were not printed, and had to be labeled, front and back, after filling. Therefore, labeling manpower has been eliminated in this case.

But the big factor, which more than offsets the higher cost for polyethylene, is the saving in shipping weight. Filled and ready to go, a four-bottle carton weighs 13 pounds (23%) less than with the glass bottles . . . a drop from 58 to 45 lb, or 56 to 43 lb, depending on type of solution.

(One-gallon polyethylene container is a product of Plax Corporation, PO Box 1019, Hartford, Conn.)

Check 3039 opposite last page.

Strong PVC drum liner for −25 to +230°F

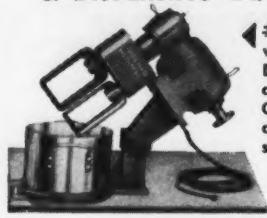
High tensile, tear strength; broad chemical resistance

Uses: Resistant, heavy-duty liner for drums and tanks for shipping and storage. Now being used for storing of hypochlorite, shipping of tungsten carbide pellets and muriatic acid. Other applications: plating chemicals, caustics and as inner liner for drums during mixing of small-batch chemicals.

Features: Resistant to most

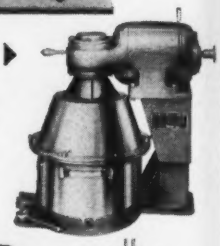
RESEARCH & DEVELOPMENT

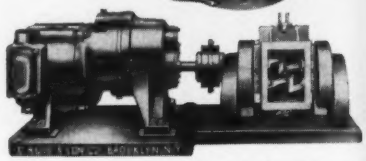
REQUIRES THE BEST MIXING, GRINDING & DISPERSING EQUIPMENT



#130EL—2 gal. variable speed Double Planetary Change Can Mixer—1 qt. — 150 gal. sizes.

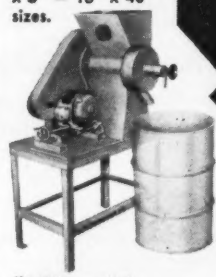
#130EL — 1 gal. vacuum tight Mixer. Available with stainless steel seamless jacketed cans and up to 1 HP exp. prf. motor drive.





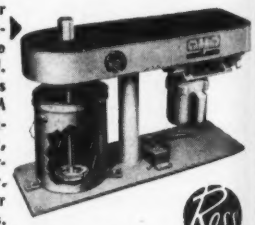
#41A—1 Pt. Double Arm Kneader. Easy to clean, jacketed, and with vacuum cover when required. 1 Pt.—150 gal. sizes.

#52LC—4½"x10". Three Roll Mill with water cooled rolls, one point adjustment and quick roll release. 2½" x 5" — 16" x 40" sizes.



#70—H size 4 Dry Grinding Mill Variable speed drive, with 1" feed size ground between ⅛" and #100 mesh as required. Many sizes including other type Disintegrators, Crushers and Pulverizers.

#140DL — High Speed Disperser with specially designed multiple action Millhead. Variable speeds up to 8000 FPM produce tremendous impact, abrasion and hydraulic shear. Laboratory or production sizes.



Write for complete information!

CHAS. ROSS & SON CO., INC.

Leading mfgrs. of wet or dry grinding Mills, Kneaders and Mixers of all types — since 1869.
154 CLASSON AVE., BROOKLYN 5, N. Y.

Check 3040 opposite last page.

chemicals, an exception being the very heavy acid series in concentrated form. Reported to have high tensile and tear strength, usable temperature range of −25 to +230°F.

Description: The 20-mil liner is made of polyvinyl-chloride formulation. It is stocked for 55-gal drum, but may be made in almost any size.

(Liner is one of series being introduced by DOR Plastics Corporation, division of Protective Lining Corporation, 22 Woodhull St., Brooklyn 31, New York.)

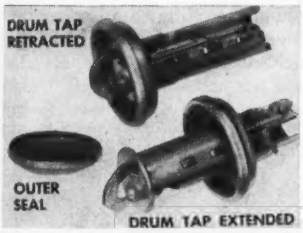
Check 3041 opposite last page.

Dripless tap telescopes flush with drumhead

Uses: Drum tap that may be installed by drummaker, or by processor at time of filling. May be used with petroleum products, cutting fluids, cleaners, soaps, disinfectants, waxes, paint products, others.

Features: Dripless retracting tap is ready for instant use by consignee; saves time since it doesn't have to be reversed.

Description: Tap is opened by slight turn and pull. Shut-off is done by pushing tap back into drum and turning



Here's how drum tap works

to locked position. Unit is flush with drumhead in "off" position. Three-slide guillotine cut-off assures positive, drip-free operation.

Taps are standard for 15-, 30-, or 55-gal drums, but special units can be furnished for smaller containers. Outer seal covers tap during shipment.

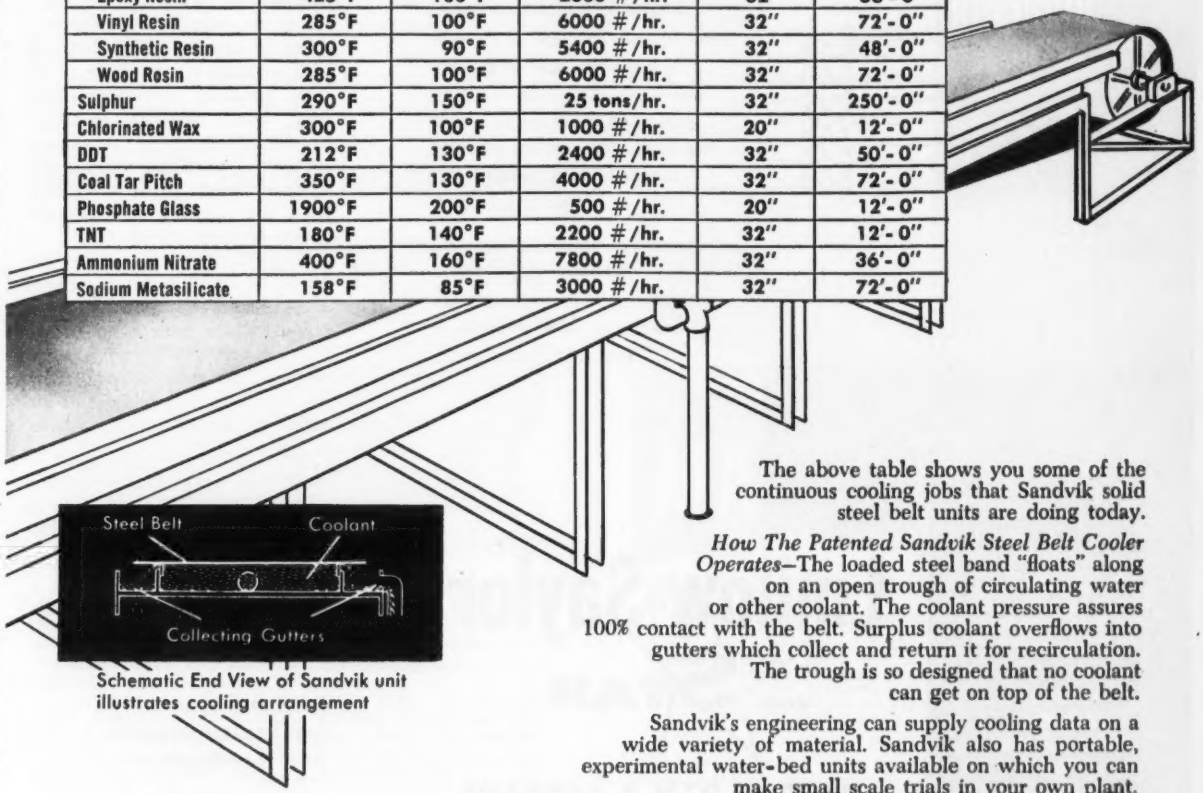
(Dripless retracting drum tap is product of Hadco Corporation, 2705 Detroit Ave., Cleveland 13, Ohio.)

Check 3042 opposite last page.

Can you use this kind of Continuous Cooling capacity?

ACTUAL EXAMPLES OF SANDVIK STEEL-BELT COOLER OUTPUT

MATERIAL	FEED TEMP. F°	DISCHARGE TEMP. F°	CAPACITY	BELT WIDTH	COOLING LENGTH
Resins					
Wood Rosin	450°F	130°F	5000 #/hr.	32"	120'-0"
Hydro Carbon Resin	400°F	100°F	6000 #/hr.	32"	84'-0"
Epoxy Resin	425°F	100°F	2800 #/hr.	32"	36'-0"
Vinyl Resin	285°F	100°F	6000 #/hr.	32"	72'-0"
Synthetic Resin	300°F	90°F	5400 #/hr.	32"	48'-0"
Wood Rosin	285°F	100°F	6000 #/hr.	32"	72'-0"
Sulphur	290°F	150°F	25 tons/hr.	32"	250'-0"
Chlorinated Wax	300°F	100°F	1000 #/hr.	20"	12'-0"
DDT	212°F	130°F	2400 #/hr.	32"	50'-0"
Coal Tar Pitch	350°F	130°F	4000 #/hr.	32"	72'-0"
Phosphate Glass	1900°F	200°F	500 #/hr.	20"	12'-0"
TNT	180°F	140°F	2200 #/hr.	32"	12'-0"
Ammonium Nitrate	400°F	160°F	7800 #/hr.	32"	36'-0"
Sodium Metasilicate	158°F	85°F	3000 #/hr.	32"	72'-0"



Schematic End View of Sandvik unit illustrates cooling arrangement

The above table shows you some of the continuous cooling jobs that Sandvik solid steel belt units are doing today.

How The Patented Sandvik Steel Belt Cooler Operates—The loaded steel band "floats" along on an open trough of circulating water or other coolant. The coolant pressure assures 100% contact with the belt. Surplus coolant overflows into gutters which collect and return it for recirculation. The trough is so designed that no coolant can get on top of the belt.

Sandvik's engineering can supply cooling data on a wide variety of material. Sandvik also has portable, experimental water-bed units available on which you can make small scale trials in your own plant. Write, wire or phone for further details.

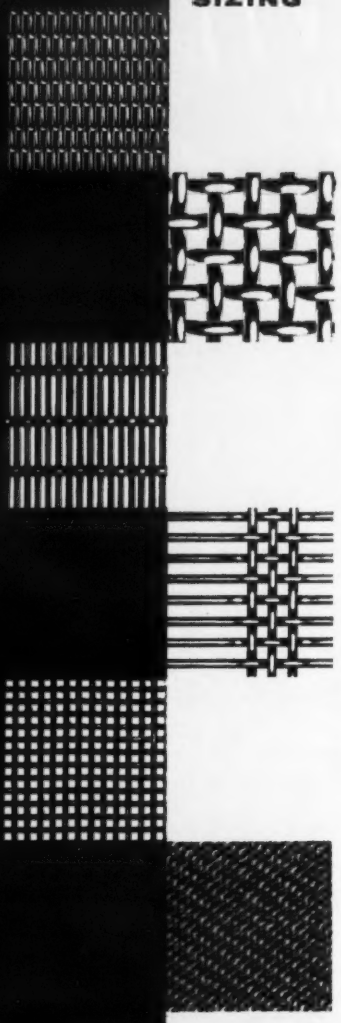
SANDVIK STEEL, INC. *Steel Belt Conveyor Department*
1702 Nevins Road, Fair Lawn, N. J. SWarthmore 7-6200
Branch Offices: Cleveland, Detroit, Chicago, Los Angeles, Montreal
IN CANADA—Sandvik Canadian Ltd., P.O. Drawer 1335, Sta. O, Montreal 9, P. Q.
Manufacturers of Steel Belt Conveyors For Over 40 Years

SANDVIK STEEL BELT CONVEYORS

SS-171R

Check 3043 opposite last page.

MORE EFFICIENT,
LOWER COST
FILTERING, STRAINING,
SIZING



The industry's highest quality – wire cloth and screen precisely engineered and precision woven to achieve the most critical predetermined results . . . to provide greater resistance to corrosion, pressure, vibration, heat or abrasion . . . to assure improved product quality and uniformity, increased production, lower costs . . . or to help solve other problems involved in your filtering, separation or straining operation.

Hundreds of weaves and sizes are in stock for IMMEDIATE SHIPMENT . . . or if none meets your requirements one can be woven promptly to meet your specific needs.

L-S and Star Cloth and Screens are woven from any steel including high-carbon, oil-tempered, stainless and other alloys; Monel, bronze, copper, brass or any metal that can be drawn into wire.

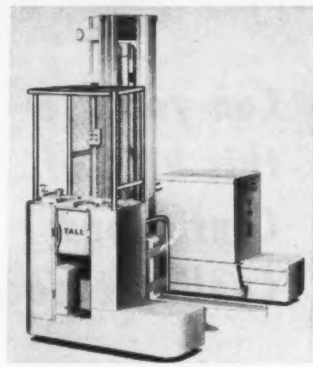
WRITE FOR CONDENSED SCREEN REFERENCE CATALOG

FOUNDED 1856

Ludlow-Saylor and STAR
WIRE CLOTH & SCREENS

LUDLOW-SAYLOR WIRE CLOTH COMPANY
614 S. Newstead Ave. • St. Louis 10, Mo.
Birmingham 512 North 18th St. Pittsburgh Union Trust Bldg.
Chicago 6261 W. Grand Ave. Houston 5638 Harvey Wilson Dr.
STAR WIRE SCREEN & IRON WORKS
2515 San Fernando Road • Los Angeles 65, Calif.

Check 3044 opposite last page.



Stacking in narrow aisles

. . . is faster and safer with this side-loading electric lift truck introduced in a 3000-lb-capacity model that can stack 18′ high. The U-shape machine handles normal pallet loads within its dimensions, long loads on low platforms formed by legs of the "U". Operator stands in compartment in one leg of "U", facing axis of aisle.

In picking up or placing load, mast extends 26″ hydraulically and, in sequence, forks and carriage extend 28″ hydraulically. Thus, forks and load are placed 12″ beyond outer edge of truck.

With truck in position to move down aisle, front wheels are locked to roll straight ahead while rear wheels are tiller-controlled for maneuvering. Separate steering handle turns locked wheels at 90° angle for travel in cross-aisles.

(Side-Loader is product of Yale Materials Handling Division, The Yale & Towne Manufacturing Company, 11,-000 Roosevelt Blvd., Philadelphia 15, Pennsylvania.)

Check 3045 opposite last page.

Belt-conveyor drives are pre-engineered and standardized

Uses: Driving belt conveyors.

Features: Standardized and pre-engineered for better balance, greater accessibility, quieter operation, simplicity and lower maintenance.

Description: Complete drive ends, available in wide variety of belt widths and horsepowers, include head pulley, headshaft, bearings, reducer, V-belts, sheaves, motor support, V-belt guard, and frame. Power is transmitted through V-belt from overhead motor to reducer which is direct-connected to headshaft.

Reducer can run in either direction when installed on reversible conveyors. It is totally enclosed, has alloy-steel helical gears.

(Standardized torque-arm belt-conveyor drives are made by Barber-Greene Company, 400 N. Highland, Aurora, Ill.)

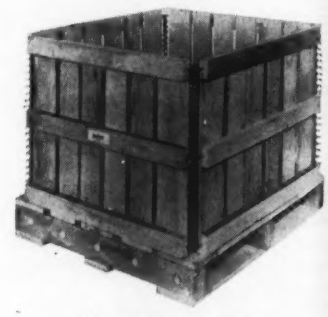
Check 3046 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Wooden pallet container can be folded, unfolded

Uses: For permanent in-plant storage or returnable shipping.

Features: Helix corners enable collapsible wooden pallet container to be folded or unfolded an infinite number of times. Unfolded, it can be attached to almost any standard warehouse pallet. When folded, it saves valuable shipping and warehouse space. There are no metal parts to bend, wear or replace.



Quick-folding container

Description: Sides are made of hardwood vertical slats and horizontal cleats. The welded

all-steel wire frame is embedded behind cleats, arranged in horizontal fashion, so that the wire extends through the wood. The wire frame gives added strength and provides a bearing surface for the helices.

Assembly is secured to pallet by various forms of quick-release attachment straps. Assembly can be converted into a returnable shipping container for granular material by adding a plastic or kraft-paper liner.

(WS Clinch-Tite pallet container is development of the Clinch-Tite Corporation, 20 East Athens Ave., Ardmore, Pennsylvania.)

Check 3047 opposite last page.

Truck attachment made for 'take-it-or-leave-it' pallet systems

Uses: Fork-truck attachment, a push-off device with side shifter and multiple forks, is designed for use with "take-it-or-leave-it" pallet systems.

Features: Handles palletized unit loads in process and storage, and also the non-palletized loads during shipment.

Description: When loading carriers, multiple-tined forks of attachment are slid between the small stringers on top of the "take-it-or-leave-it" pallet and the load is raised off. Load is then moved to carrier and pushed off forks onto trailer floor.

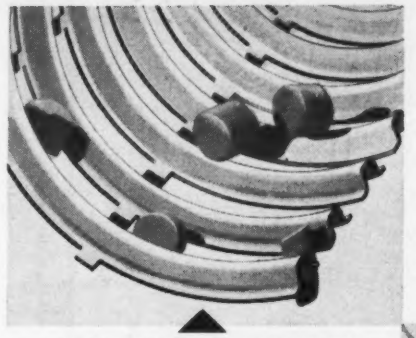
(Attachment is product of Dept. R9-8, Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Mass.)

Check 3048 opposite last page.

Lithographed metal containers—Carefully integrated series of pictures and captions in 42-page booklet tells steps in designing and producing "containers that sell." Graphic illustrations show the specialized techniques employed in producing high-quality lithography on the metal. "Traveling Through Clark"—J. L. Clark Manufacturing Company.

Check 3049 opposite last page.

get accurate sizing with SIMON-CARTER machines

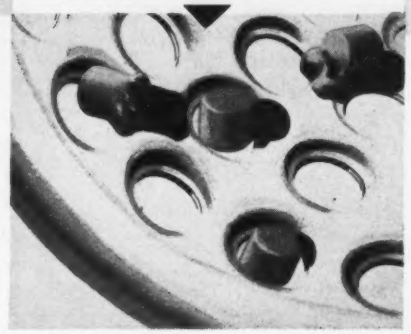


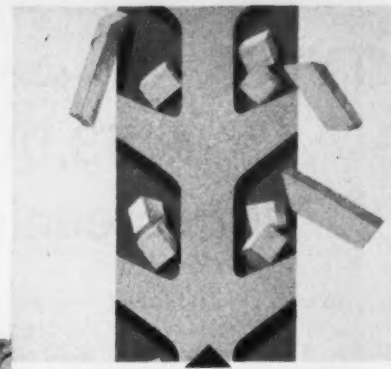
PRECISION GRADERS SEPARATE MATERIAL BY THICKNESS

For sizing and separating free-flowing granular materials by *thickness*, Carter Precision Graders use revolving cylinders with slotted perforations. Material placed in these cylinders is upedged and presented to the slots in an edgewise position. The thinner pieces pass through, and the thicker pieces pass over and are conveyed to the end of the machine.

CARTER GRADERS ALSO SIZE AND SEPARATE BY WIDTH

For *width* sizing and separating, the Precision Graders use revolving cylinders with round perforations. Material placed in these cylinders is upended and presented to the round perforations in an endwise position. Narrow pieces pass through, and wider pieces pass over for discharge at the end of the cylinder.





CARTER SEPARATORS ASSURE POSITIVE LENGTH SEPARATION

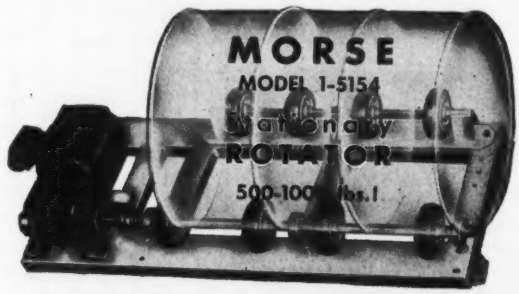
Carter Disc Separators contain a series of discs, each of which has hundreds of undercut pockets which select or reject materials according to *length*. As the discs revolve through a mixture of materials, the pockets lift out shorter pieces. Longer pieces, too long to be held in the pockets as they rise, drop away from the discs.

Write today for complete information and descriptive booklets on Simon-Carter machines. Free laboratory testing and demonstrating service.

SC SIMON-CARTER CO. 677 19TH AVENUE N.E. MINNEAPOLIS 18, MINNESOTA

Check 3050 opposite last page.

HEAVY DRUM ROTATING



Cuts Costs . . . Fast . . . Safe

You can now mix, blend or tumble loads up to 1000 lbs. with the new MORSE Model 1-5154 Stationary ROTATOR. It is primarily engineered for heavy loads in 30 to 55 gallon drums yet lesser loads can be rotated with equal efficiency. Any diameter drum can be mounted by adjusting only three bolts.

The rugged ½ H.P. motor can be geared to give any fixed speed from 5 to 30 RPM. Six inch drive wheels (4) and idler wheels (4) have Neoprene treads for smooth, non-slip revolving. Drive shaft, idler shaft and all welded steel frame are extra rugged construction for long-lasting, trouble free operation.

A double drum model No. 2-5154 with a 2000 lb. capacity is also available. Write today for brochure on complete Morse line.

DRUM & BARREL HANDLING EQUIPMENT MORSE E. SYRACUSE, N.Y.

MORSE MANUFACTURING CO., INC.

757 West Manlius Street, East Syracuse, N. Y.

Check 3051 opposite last page.

MAISCH METERING PUMPS

- COMPLETELY SANITARY, STAINLESS STEEL CONSTRUCTION.
- POSITIVE DISPLACEMENT—SMOOTH, UNIFORM, NON-PULSATING FLOW.
- PUMP HEADS DEMOUNTABLE WITHOUT TOOLS . . . FOR INSPECTION, CLEANING AND STERILIZING.
- DISPENSE BOILING-HOT OR ICE-COLD WATERY LIQUIDS OR HIGHLY VISCOUS FLUIDS.

Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Write for complete details and prices.

mechanical mp products

MECHANICAL PRODUCTS CORPORATION

1722 WEST HUBBARD STREET, CHICAGO 22, ILLINOIS

Check 3052 opposite last page.

TYLER service offers 53,000 ways to cut screening costs

To meet all the different requirements for sizing, grading, and separating materials, W. S. Tyler has developed wire cloth in innumerable types, sizes, metals, meshes, and designs. Today, over 53,000 different specifications are available.

Matching the *right* wire cloth to your specific needs is the service provided by your Tyler sales engineer. From Tyler's unequalled range of product he has the know-how and experience to give you results.

That's *Tyler Screening Service*—use it to cut your production costs.

WOVEN WIRE SCREENS • SCREENING MACHINERY • TESTING SIEVE EQUIPMENT

TYLER

The W. S. TYLER Company • *Cleveland 14, Ohio*

OFFICES: New York • Chicago • Boston • Philadelphia • Atlanta
Dallas • Los Angeles • San Francisco • Baltimore • Birmingham • Houston • Minneapolis
Pittsburgh • Salt Lake City • The W. S. Tyler Company of Canada, Limited,
St. Catharines, Ontario • OFFICE: Montreal

Check 3053 opposite last page.

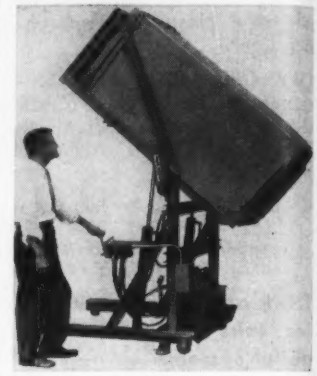
Latest container types emptied by dumper

Uses: Dumping bulk containers. Handles loads up to three tons, dumping heights to four feet or more.

Features: Designed to handle the newer types of bulk-material containers.

Description: Supplied with or without casters. Mobile units have four ball-bearing casters, rear ones being swivel type. Floor locks hold dumper while loading or dumping. Grooved casters are available for floor-track operation.

Dumpers are hydraulically operated by lever or push-button, can be loaded by hand or fork truck.



Dumper handling "Pillar-Pac" container

(Hydro-Dumper is design of Essex Conveyors, Inc., 165 Franklin Ave., Nutley 10, New Jersey.)

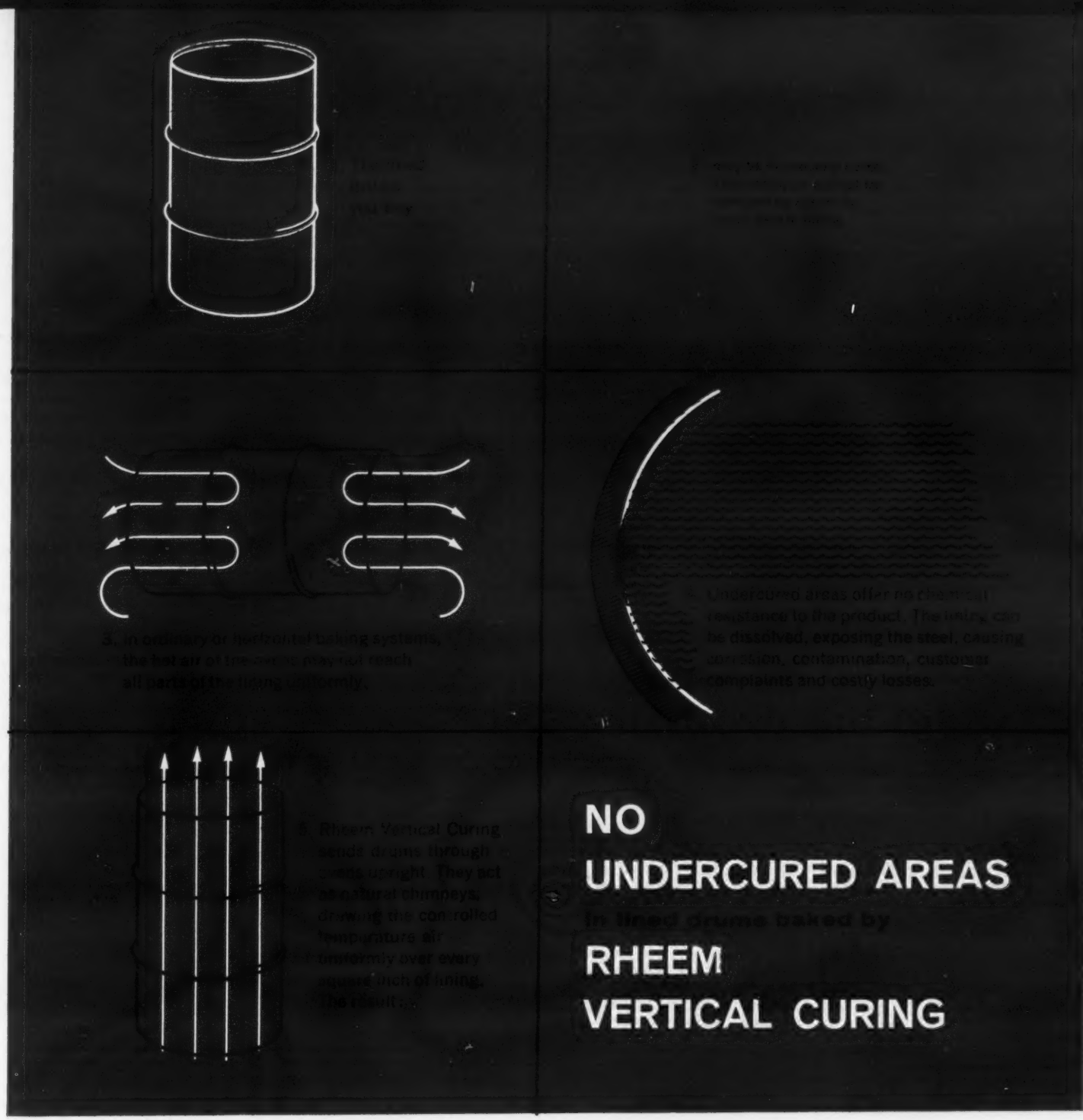
Check 3054 opposite last page.

Bucket elevator is mobile

Bucket elevator on casters can be moved from place to place, as needed, for lifting granular materials. Available in heights from 6 to 12′, units come complete with electric motor, steel buckets bolted to belt, delivery chute, and hopper to suit application.

(Mobile bucket elevator is product of New London Engineering Company, New London, Wis.)

Check 3055 opposite last page.

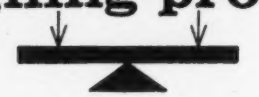


And that's not all. For more than three years, Rheem Centrifugal Spray has been delivering lined drums free of pinholes, blisters, thin spots and globs or skips. Air turbulence is eliminated. Human error is eliminated. Lining thickness is controlled to within 1/10 of a mil. For more information, or help in developing a lining for a problem product, write the world's largest manufacturer of steel shipping containers at 1701 West Edgar Road, Linden, New Jersey. Plants across the country . . . Chicago, Houston, Linden, New Orleans, Richmond, Calif.; South Gate, Calif.; Tacoma. For other sales offices see the Yellow Pages.

Rheem

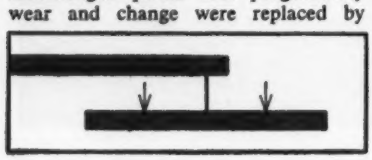
Check 3056 opposite last page.

How did this team solve an age-old weighing problem?



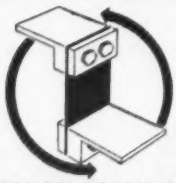
Since 5,000 B.C. men have been trying to devise a pivot balance that would be highly sensistive yet remain accurate. The breakthrough came in 1956 when the United States issued a patent for a "Thayer Flexure Plate" Leverage System. A team of engineers and businessmen, aware of industrys great cumulative loss of materials in weighing operations, had invented a revolutionary new scale.

Knife-edged pivots that progressively wear and change were replaced by Thayer Flexure Plates that move only .001", yet accurately reflect the minutest changes in weight. This *firmly joined* lever withstands shocks and vibrations indefinitely. Dirt and dust are no longer a problem. Thayer guarantees this leverage system accurate for the life of the scale.



How Can It Save You Money Year After Year?

Working in conjunction with straight electrical controls, it forms the most reliable, low maintenance system ever devised to control processing or materials handling *by weight*. Literature on its application to filling, batching and checkweighing operations is available on request.



THAYER SCALE

AUTOWEIGHTION SYSTEMS FOR FILLING, BATCHING AND CHECKWEIGHING

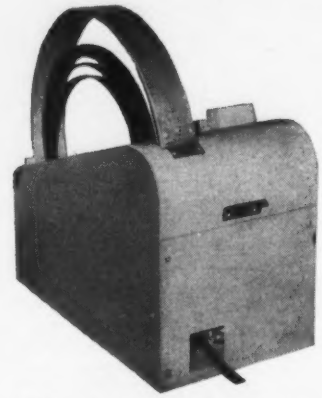
THAYER SCALE CORP. THAYER PARK, PEMBROKE, MASS.

Check 3057 opposite last page.

Just dial length, number of steel straps desired!

Uses: For automatically cutting quantity and length of steep strapping.

Features: Operator sets dial on dispenser to length and number of straps desired, then pushes button to get what he wants. Guesswork is eliminated and waste is reduced.



Operates on electricity and air

Description: Unit is adjustable to accommodate ¾", 1¼" or 2" flat steel strapping in ribbon wound coils. It operates on 110v, 60-cps, single phase; uses 60- to 90 psi.

(No. 440 Bulkbinder "Dial-A-Band" dispenser is product of A. J. Gerrard and Company, 1950 Hawthorne Ave., Melrose Park, Ill.)

Check 3058 opposite last page.

Vinyl-backed tape for packaging

Transparent, vinyl-film-backed packaging tape recently introduced will resist water, acids, alkalis and solvents. It can be used with manual, semi- and fully automatic dispensers and applicators.

The dimensionally stable tape is 2.8 mils thick, has tensile strength of 30 lb/in of width and is available in widths of ¼ to 43".

("Scotch" brand "Paklon" film tape 681 is a development of Minnesota Mining and Manufacturing Co., 900 Bush Ave., St. Paul 6, Minn.)

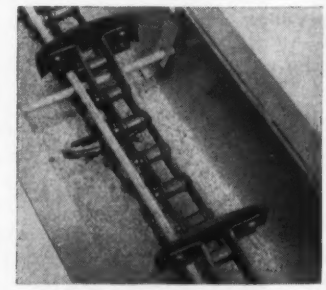
Check 3059 opposite last page.

Enclosed flight conveyor cleans itself

Carries bulk materials on level or slight incline

Uses: Conveying free-flowing, granular, non-abrasive bulk materials in horizontal or limited inclined paths.

Features: Fully enclosed, self-cleaning. Return strand of chain is carried on double-rod guide bars through upper portion of trough. This provides proper tracking of chain and minimizes material collection.



Interior view shows flights on combination chain in conveyor's trough

Description: Consists of single strand of C-class combination chain carrying spaced flights within covered U-trough. Head and tail shafts rotate in sealed, self-aligning ball bearings.

Flights are flexible, nonmetallic material stiffened by

steel plates bolted to chain attachments. Flights match trough contour to assure self-cleaning action. Heavy steel troughs are standard, but other metals are available. Covers are removable. Various types of discharge spouts and gates and drive arrangements are available.

(Flite-Flo conveyor is product of Dept. PR, Link-Belt Company, Prudential Plaza, Chicago 1, Ill.)

Check 3060 opposite last page.

NEW LITERATURE
Material Handling and Packaging

Floor trucks and associated equipment are presented in 56-page catalog which includes simplified data to expedite ordering. Included are four- and two-wheel platform trucks; box and wagon trucks; dollies; semi-live skid systems; barrel-drain racks; special trucks. Cat 140—The Hamilton Caster & Mfg. Co.

Check 3061 opposite last page.

Vibratory feeders—Six-page bulletin discusses construction, advantages, and application of five AC vibratory feeders for handling up to 10 tons per hour (dry sand). Bul VB-10-1—Eriez Manufacturing Company.

Check 3062 opposite last page.

Belt-conveyor idlers for heavy-duty service are introduced in bulletin. Specifications and dimensions for selecting and ordering correct units for every application are included. Heavy-duty Idler Bul—Barber-Greene Company.

Check 3063 opposite last page.

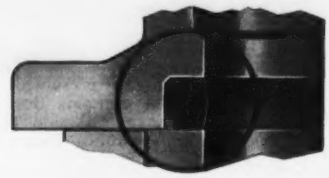
Fork truck with gas power and pneumatic tires, designed for handling 2000-lb loads over rough floors, is pictured and described in four-page C-20 Pneumatic Brochure—Industrial Truck Division, Clark Equipment Company.

Check 3064 opposite last page

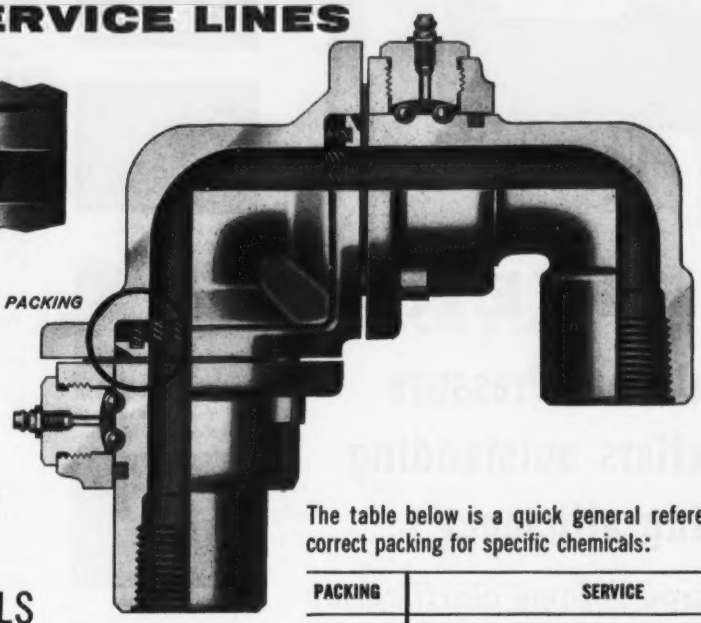
Fork-lift-truck series is introduced in 24-page booklet which pictures and details features of the 2000- to 4000-lb-capacity models. Booklet SP-10—Towmotor Corporation.

Check 3065 opposite last page.

NEW CHIKSAN SWIVEL JOINT
GIVES SAFE, LASTING FLEXIBILITY TO CHEMICAL SERVICE LINES



VIEW ABOVE SHOWS MOLDED PACKING



VIEW AT RIGHT SHOWS DISC PACKING

INTERCHANGEABLE PACKING FEATURE ENABLES **DS SERIES** TO HANDLE A WIDE RANGE OF CHEMICALS IN SERVICES FROM –65°F TO +400°F AT 300 PSI

The DS Series swivel joint with its broad service range can be a valuable new tool in your process system. Use it in chemical loading of tank car or tank truck, for stress relief in piping subjected to vibration, expansion or settling, or as a steam rotation connection between stationary and revolving equipment. Wherever you use it, you'll find it pays for itself in extended service life.

Using a disc or molded type packing, this swivel joint can be applied to handle steam and any of a wide variety of chemicals processed in your plant. And the split segment feature of the DS Swivel Joint allows replacement of packings without removing the joint from the line.

Buy and apply Chiksan DS Series Swivel Joints for chemical service lines in your plant now. You can select from eight basic styles for full rotation in one, two or three planes. For more information write to Chiksan or fill in the coupon below.

The table below is a quick general reference for the correct packing for specific chemicals:

PACKING	SERVICE
Neoprene	Recommended for alkaline and acid salt solutions and aldehydes such as formaldehyde.
Hycar	These should be used for petroleum derivatives, neutral or slightly acidic salt solutions, dilute acids (Sulfuric to 50%, Hydrochloric and Nitric to 20%), alcohols, glycols, ethers, gases (Oxygen not over 500 psi), and vegetable oils.
Butyl	Recommended for liquid or anhydrous ammonia, gases (except oxygen over 500 psi), ammonia derivatives such as hydrazine and for certain hydraulic fluids such as Pydraul, Skydrol, and Cellulube. It is recommended for acetone and methyl ethyl ketone.
Teflon*	Used for concentrated or fuming acids and other highly oxidizing fluids, esters, aromatics, liquid chlorine, bromine and fluorine if temperature is not excessive.
Asbestos	For use in saturated steam service.
Viton "A"*	Recommended for use with concentrated acids, aromatics, liquid chlorine, liquid bromine, chlorine or bromine derivatives, molten sulfur, and carbon disulfide.
Metallic	For extreme services such as hot gas at 600°F., a Stainless Steel metal disc, specially treated to prevent galling, is recommended.

* R.T.M. DU PONT

CHIKSAN COMPANY, 330 North Pomona Ave., Brea, California

Please send me copy of Bulletin No. 1258

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City_____ Zone____ State_____

#59-46

CHIKSAN fmc

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

CHIKSAN COMPANY—Brea, California • Chicago 5, Ill. • Newark 2, N.J. • Weco (Division), Houston 24, Texas • Subsidiaries: Chiksan Export Co. • Chiksan of Canada Ltd.

Check 3066 opposite last page.

Engineered to improve processing

SHRIVER

Vertical Leaf Pressure Filter offers outstanding operating efficiency

- *For large volume clarification*
- *For high filtration efficiency*
- *For quick discharge of solids and easy cleaning*

The Shriver "HTVL" horizontal tank vertical leaf pressure filter provides the maximum in performance. It incorporates the most advanced design features to assure perfect clarity of filtrate; uniform, reasonably dry cake; easy accessibility for cleaning and compactness.

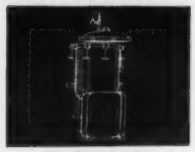
The filter is available in 27 standard combinations of tank size and number of filter leaves. Leaf assembly, filtrate discharge and leaf carriage simplify operation.

There's a Shriver "HTVL" filter unit for your needs—now or projected.

Send for handy Bulletin 146 which tells all you'll want to know about the filter for better filtration.

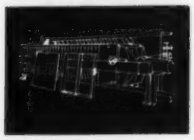
Filter presses

Horizontal tank, vertical leaf filters



Vertical tank, vertical leaf filters

Vertical tank, horizontal plate filters



Plastics polymerizers and slabbers

Continuous thickeners

Filter media textile and metal

Diaphragm pumps

T. SHRIVER & COMPANY, INC.
846 HAMILTON STREET · HARRISON, N. J.
SALES REPRESENTATIVES IN Atlanta, Ga. — Buffalo, N. Y. — Chicago, Ill. — Detroit, Mich. — Houston, Tex. — Los Angeles, Cal. — St. Louis, Mo. — San Francisco, Cal. — Montreal, Que. — Toronto, Ont. — Mexico City, Mex.

Check 3067 opposite last page.

HANDLING & PACKAGING

Lift trucks for safe, speedy handling of loads up to 20 tons are illustrated in eight-page brochure which emphasizes performance, maneuverability, traction and stability, along with engineering and construction features. Challenger 360/400 Bul—Hyster Company.

Check 3068 opposite last page.

Oriented polystyrene sheet and film for packaging is subject of portfolio which contains descriptive literature, samples and price lists. Polyflex Portfolio—Plax Corporation.

Check 3069 opposite last page.

Vibrating conveyors are fully described and specified in four-page catalog section, "Mechanical Vibrating Conveyors" — Syntron Company.

Check 3070 opposite last page.

Automatic filler for granular, powder, liquid and paste materials is specified in four-page catalog. Cutaway illustrations make functioning easy to understand. "Bartelt Automatic Filler"—Bartelt Engineering Company.

Check 3071 opposite last page.

Scales of dormant, built-in, portable and bench types, plus counting, overhead track, and printer scales, are illustrated and described in Cat 651—Detecto Scales, Inc.

Check 3072 opposite last page.

Flight conveyor which is self-cleaning and handles free-flowing, granular, non-abrasive bulk materials in horizontal or limited inclined paths is subject of illustrated four-page Folder 2813—Dept PR, Link-Belt Company.

Check 3073 opposite last page.

Industrial trucks—Factors to aid in deciding whether to replace an old industrial truck with a new one, or rebuild the old one, are considered in five-page article. "Buy or Rebuild"—The Elwell-Parker Electric Co.

Check 3074 opposite last page.

Hoist specifications—Ten-page booklet defines and spells out recommended minimums of hoist construction, outlines basic information that should accompany any inquiry sent to a hoist manufacturer or distributor. Concerned with electric wire-rope types, booklet is first in a series that will cover other types. "Standard Specifications for Electric Wire Rope Hoists" may be obtained by writing to Hoist Manufacturers Association, Inc., One Thomas Circle, Washington 5, D. C.

Dependable, Low Cost

• **GRINDING**
• **MIXING**
• **BLENDING**

abbé
ENGINEERING
PEBBLE and BALL MILLS

EASY TO CLEAN

NO SEPARATE MIXING

INCREASED CAPACITY

For quality-controlled, low cost dry or wet grinding, mixing or blending on a production basis, you'll find Abbé-Engineered Pebble and Ball Mills unequaled in production speed, operating cost and service life.

Abbé-Engineered Pebble and Ball Mills are available in a complete range of sizes from 40 to 13,000-lb. capacities.

Ask for quotation on Abbé "Non-Contaminating" Rubber-Lined Pebble Mills. Write for Abbé Mill Catalog No. 77

abbe ENGINEERING CO.
620E GRAYBAR BLDG., NEW YORK 17, N. Y.
Designers and Manufacturers of
Ball, Pebble and Jar Mills • Pulverizers
Sifters • Cutters • Mixers

Check 3075 opposite last page.

Finished catalyst pellets have higher uniformity, thanks to spray-dried fines

Proving that it's often possible for one unit to do a better job than three, efficient spray dryer at Girdler boosts production, cuts costs, and . . .

Upgrades Water-Gas Shift Catalyst

Problem: An excessive number of production steps were required to manufacture water-gas shift catalyst (which shifts equilibrium of carbon monoxide to carbon dioxide) at the Girdler catalysts plant of the Chemical Products Division of Chemetron Corporation, Louisville, Kentucky. As part of the process, it was necessary to filter a colloidal mixture, steam dry it, and granulate it.

Batch operations were necessary since the slurry did not readily lend itself to continuous filtration. Final product had to be in the form of fines that could easily be pressed into tablet form.

Solution: After a thorough investigation of the overall process, it was decided to substitute continuous spray drying for the batch filtration, steam drying, and granulation steps. Successful tests conducted at a spray dryer manufacturer's laboratory indicated that the process would work equally well on a production basis. A stainless steel unit with a 10′ diam was consequently installed for this purpose.

In operation, slurry containing about 20% solids, is preheated to 120°F and pumped to the dryer. Mixture consists of precipitated and purified chromium and iron oxides combined with additives in a liquid carrier.

Actual introduction into dryer is achieved through a ceramic-coated, stainless-steel disc rotating at 9000 to 11,000 rpm. Sharp edges on the disc control degree of atomization which determines particle size range of dried product. The ceramic coating protects disc from corrosion and abrasion.

Slurry enters drying chamber as small droplets, each enclosing an oxide particle. Depending upon solids concentration of slurry, chamber temperature at inlet is from 900 to 1000°F.

Shock-heating of droplets dehydrates them rapidly during their descent to ejection—but at the same time does not overheat them. Exit temperature is kept at 300 to 400°F, for a temperature differential of 600°F. Heat is provided by means of a direct-fired gas heater.

Overall processing time is about 12 to 15 seconds. Actual retention time in drying chamber is only seven to ten seconds. Maximum particle size of dried product is 50 microns.

The spherical-shaped particles are collected by a cyclone and conveyed to storage silo ready for feeding to tablet presses. Fines not trapped by cyclone are recovered in a scrubber and recycled back to process.

Results: Switching to continuous spray drying has boosted catalyst production, increased quality, and decreased costs. The unit is capable of handling up to 300 lb per hr of solids. Automatic control assures output of uniform, top-quality product using only minimum labor.

When production schedules demand it, the spray dryer can operate continuously, around the clock, for months at a time. The only maintenance required is periodic cleaning. This is done after every three or four days of continuous production. The operation consists of simply sweeping out the unit.

The ceramic-coated, stainless-steel disc is also checked frequently. Due to the abrasive nature of the feed, the disc does require occasional replacement.

The spray dryer has been tried and has performed satisfactorily on numerous types of catalysts. However, because of the ever-present danger of cross-contamination between catalysts, use of the unit is being restricted to the water-gas shift type.

(Spray dryer was manufactured by Bowen Engineering, Inc., North Branch, N. J.)

Check 3076 opposite last page.

(Further information about water-gas shift and other catalysts may be obtained from Girdler Catalysts, Chemical Products Division, Chemetron Corp., Louisville, Ky.)

Check 3077 opposite last page.

Tabletting presses take the 50 micron and under spherical fines produced by the spray dryer and convert them into pellets

Spray dryer works round-the-clock producing water-gas shift catalyst

it will save you money!
to see how,
write today for this folder . . .

Ask for Bulletin T-131; Whiting Corporation, 15620 Lathrop Avenue, Harvey, Illinois

87 OF AMERICA'S TOP 100 CORPORATIONS ARE WHITING CUSTOMERS

TRACKMOBILE®

WHITING

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT.

Check 3078 opposite last page.

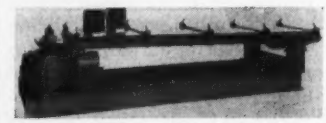
High cooling efficiency, easy cleaning featured on rotary unit

Cooler is designed for continuous operation, low maintenance

Uses: Cooling wide variety of materials in chemical and allied fields.

Features: Design permits cooling to be accomplished efficiently in matter of minutes. Flat, circular motion provides maximum use of cooling surface and permits constant contact between product and cooling surface. Cooler is covered and completely dust tight. Unit can be opened and cleaned quickly.

Description: Cooler is a self-contained unit counter balanced so that there is negligible vibration. Machine may



Cooler's flat, circular motion provides maximum use of cooling surface, results in high heat transfer

be either bolted directly to floor or mounted on supporting platforms. It is also possible to suspend them from cables.

Cooling is accomplished by circulating 10-15 gpm, 12 psi water (or other liquid) through baffled stainless jacket located beneath flat cooling surface. Cooling surface is moved with a horizontal gyratory motion (about 220-260 rpm) at feed end, which diminishes to straight line motion at discharge end. This also results in conveying action, causing product to be moved across length of machine.

Efficient heat transfer occurs. Tests have shown that with coarse, granular material, heat transfer coefficients of 22 Btu per hr per degree fahrenheit per sq ft are achieved. For finer materials the number is 20.

At present there are two production units available. Large machine has 30 sq ft of cooling surface. Smaller model

has 15. Former is powered by 3 hp, 1800 rpm motor. Latter takes 2 hp, 1800 rpm unit.

All mechanical parts are designed for continuous operation and low maintenance. Interiors are stainless steel with smoothly polished surfaces and rounded corners.

(Rotex cooler is product of the Orville Simpson Company, 1230 Knowlton St., Cincinnati 23, Ohio.)

Check 3079 opposite last page.

Centrifuge is a natural for highly automated continuous plants

Large units can handle up to 50 tons per hour

Uses: Separating wide variety of liquid-solid materials, including those with particle sizes down in 50 to 100 micron range.

Features: Machine is compact and is designed for easy accessibility to all working parts, making it well-suited for highly automated continuous processing plants.

Description: Described as a push-type, multi-stage centrifuge, machine is a development of Switzerland. Unit has ability to handle wide range of products, including slower draining materials at high outputs.

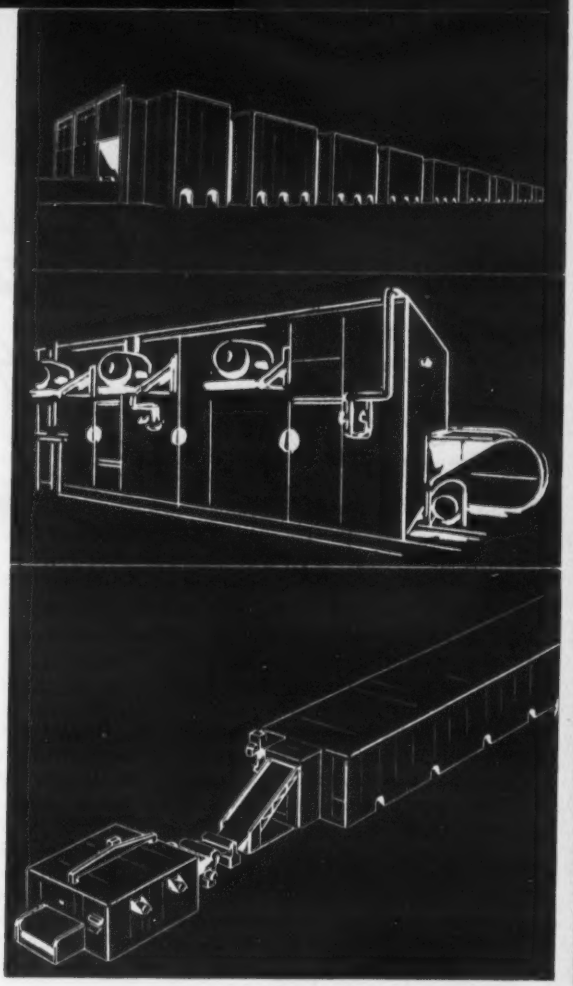
Practically no operator attention is required. Power consumption is low. It is estimated that in some cases processing costs can be reduced by as much as 25 percent over conventional methods.

Production or discharge rates of the machine can be easily controlled. Unit is available with capacities ranging from a few hundred pounds to 50 tons an hour. Materials are processed by a number of baskets which telescope in one another. Alternate baskets provide pushing action axially during centrifuging.

(Centrifuge is manufactured in U. S. by Chemical Machinery Division of Baker Perkins Inc., Saginaw, Michigan.)

Check 3080 opposite last page.

NATIONAL PROVIDES
THE *Economical Solution*
TO *Any Drying Problem!*



No matter what your product may be, it can be dried or otherwise processed at a lower cost per pound or other unit, in one or more of the various types of "NATIONAL" equipment.

High-speed production; maximum effective use of the drying medium under finely adjusted control; adaptability to existing plant conditions and future expansion; and the assurance of long, trouble-free operation are among the important reasons why "NATIONAL" machines are being erected in more and more chemical plants throughout the United States and in other countries.

"P-4" CONSTRUCTION. The result of a radically new approach to simplified Dryer construction, "P-4" Construction provides a precision-built, prefabricated structure, with trussed-and-tensioned insulated panels. It assures a more rigid, durable machine, with installation time in your plant reduced as much as 50%.

"ADD-A-UNIT" DESIGN. This unique accomplishment of "NATIONAL" engineering provides alternatives which are both practical and economical—(1) simplification of the initial installation based on present requirements; (2) maximum adaptability to step-by-step future expansion.

OTHER SPECIAL FEATURES. Patented Super-Power Fans, made in our own shops to specifications developed through years of industrial drying experience. Patented Indexing Orifices, Turning Vanes and other devices and arrangements assure unequalled versatility and precision in air distribution and control. The heat source may be steam, gas, oil or other medium.

When you have a *new* product which presents a drying problem, or if you want to improve your present drying processes, call "NATIONAL" Engineers for consultation. It is your surest way to improved production and lower over-all costs.

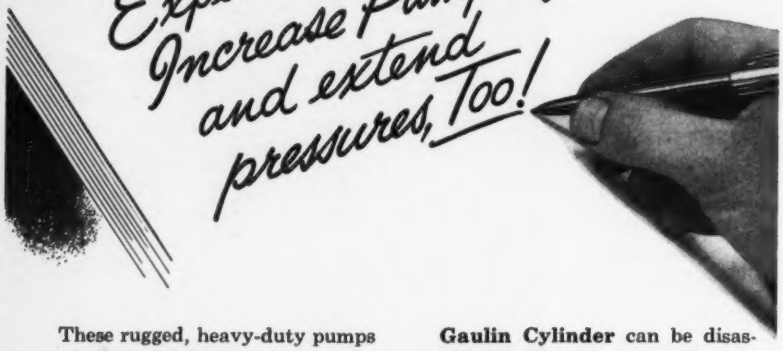
THE NATIONAL DRYING MACHINERY COMPANY
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass.
Southern Agent: HAYES TEXTILES, INC., Spartanburg, S. C.
Cable Address: "NADRYMA"—W.U. Code

Check 3081 opposite last page.

GAULIN TRIPLEX PUMPS

Turn in Lower Operating Expense Accounts... Increase Pumping capacity and extend pressures, Too!



These rugged, heavy-duty pumps are built to minimize operating, inspection and maintenance costs. They handle large volume of all types and densities of fluids.

Horizontal Design provides well area separating product from crank case.

Well Area can be gasketed for maintaining sterility . . . or for inert compatible chemicals (gases or liquid) for hazardous materials.

Gaulin Cylinder can be disassembled in minutes. Capacities from 50 to 6500 GPH . . . pressures from 500 to 12,000 psi.

Write for Bulletin P-55. At the same time ask for GTA . . . Gaulin Technical Assistance . . . for experienced advice and factual data on the best method to move or blend your product.

Check chemical engineering catalog for representative nearest you.

Send for the GTA library of product information.

Gaulin TRADE MARK

MANTON Gaulin

55 Garden Street, Everett 49, Mass.

World's largest manufacturer of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills

Check 3082 opposite last page.

Improved involute design mechanical dust collector has wide applications

Features larger diam tubes, redesigned hopper valve

Uses: Improved involute design permits efficient collection of abrasive or heavy dust loadings in chemical, petroleum, cement, and similar plants.

Features: Virtually any size job can be handled through the wide variety of arrangements possible.

Description: Mechanical dust collector consists of involute design. Larger diam tubes and improved hopper discharge valve have been incorporated.

Collector combines advantages of larger tube diam with high efficiency of Aerovane tubular design. Hopper discharge valve is available in both single and double arrangements, in wide variety of sizes, engineered for specific installations.

Catalyst dust suspended in reactor effluent and regenerator flue gases from fluid catalytic cracking process may be efficiently collected by the unit. To handle highly abrasive dust, collectors can be fitted with steel mesh liners incorporated with castable cements.

(Involute-type Cyclo-trell dust collectors are product of Research-Cottrell, Inc., Bound Brook, N. J.)

Check 3083 opposite last page.

Fast, thorough mixing, provided by 'pint-size' turbine mixer

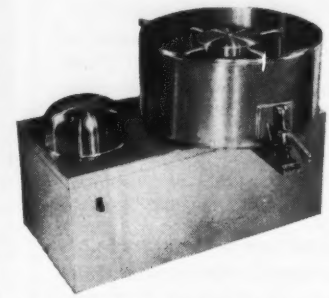
Doughnut-shaped pan has no dead spots

Uses: Unit is designed for either wet or dry blending, as well as slurry mixing. Mixer is suitable for either pilot plant or small production applications.

Features: High-speed rotary action mixes fast and thoroughly without grinding, crushing, or altering particle size of ingredients.

Mixer needs no fixed mounting, can be easily carried by two men — making it possible to be shifted within plant for on-the-spot mixing.

Description: Turbine mixer has ½ cu ft capacity. Stainless steel construction permits wide range of chemicals to be processed. Mixing bowl is jacketed for heating and cooling.

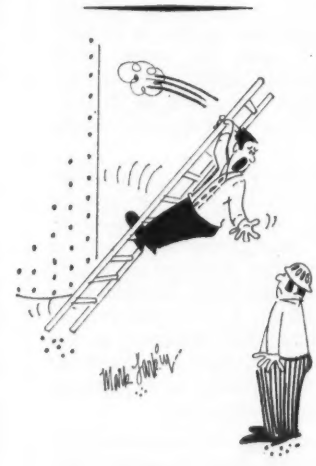


Turbine mixer has ½ cu ft capacity, can be carried by two men

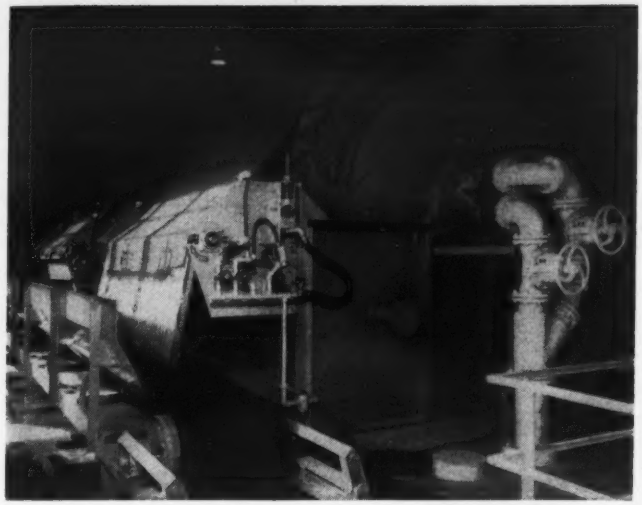
Unit has variable-speed drive. Over-center lock provides liquid-tight seal on bottom discharge door. Powered by ½ hp motor mixer requires 220 AC, 3-phase current.

(Pilot-size turbine mixer is product of T. L. Smith Company, 2835 N. 32 St., Milwaukee, Wisc.)

Check 3084 opposite last page.

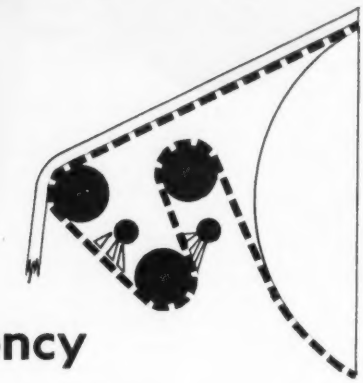


"May I borrow your helmet?"



Continuous cake discharge and cloth washing are accomplished by roller mechanism and jet spray apparatus mounted on front of filter. Units shown have 10' diam and 8' face

Dotted line illustrates path followed by filter medium as it leaves filter drum. Cake breaks cleanly from filter medium when it passes over first roll. Jet sprays scour off any remaining particles. Cloth returns to drum completely clean



Incorporating a mechanism that automatically removes and washes filter medium during every rotation, continuous belt drum filter . . .

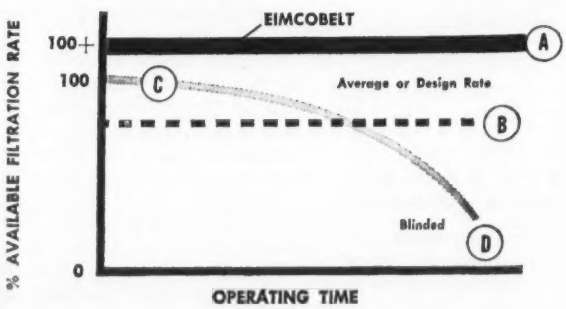
Maintains peak filtration efficiency at all times

Uses: Continuous separation of a wide variety of liquid-solid products in chemical and allied industries.

Features: Filter medium is automatically removed from drum during every rotation, thoroughly cleaned, and returned to drum. A constantly clean filter medium is assured at all times. Cake discharges by itself. No air blow or scraper blade is necessary.

Design permits maximum filtration efficiency to be maintained continuously. Consequently, many benefits and savings may be realized. Filtrations are speeded, blinding is eliminated, downtime minimized, and filter medium life greatly extended.

Description: Continuous belt drum filter is designed for use with either cloth or metallic filter media. Cake discharge



Rate-time graph shows how filtering efficiency remains constant for continuous belt drum filter (curve A). Curve C illustrates progressive blinding reducing filtration efficiency on conventional drum filter, handling difficulty slurry. Point D is reached when filter can no longer handle curve B

SMALL DIAMETER TUBING

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Stainless . . . Monel . . . Inconel

Fast delivery on most-frequently-ordered sizes and alloys await your call. Modern production equipment and specialization in small diameter tubing assure quick delivery on "special" orders.

Diameters from ⅛" to 1". Tempers and finishes available to meet every specification.

All Greenville tubing undergoes a series of production line tests to insure uniformly close tolerances. Random samples receive crush and flare tests. All drawn tubing is 100% eddy current tested. Air-pressure, hydrostatic-pressure or other tests are made in accordance with purchaser's end-use and specifications.

Let us quote on your next order . . . large or small.

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SEND FOR CATALOG 102

. . . gives detailed information on sizes, alloys, tolerances, bursting pressures, corrosion resistance.

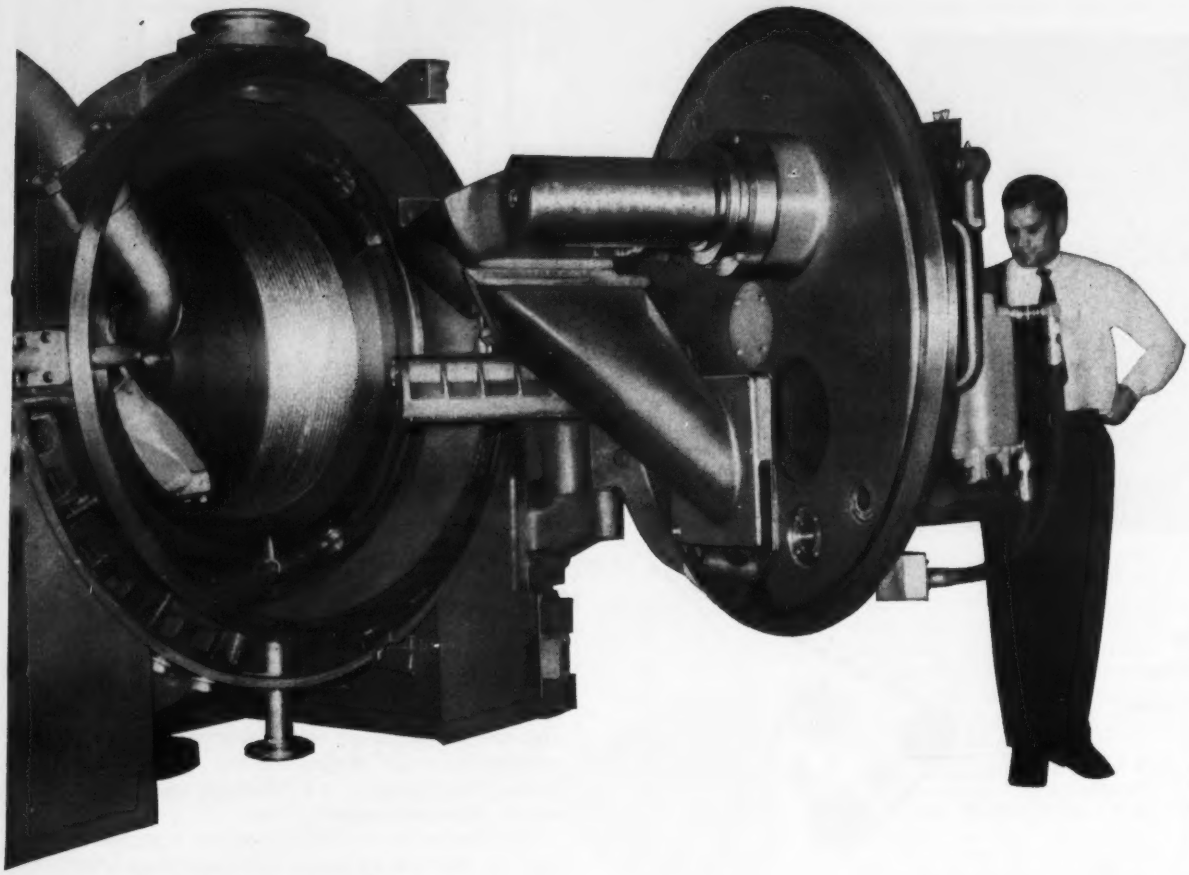
G TUBES

GREENVILLE TUBES, INC.

Greenville, Pennsylvania
Phones: Transfer, Pa.—Mitchell 6-3200; Greenville, Pa.—1874

Check 3085 opposite last page.

a new dimension in crystal dehydration



CAPACITIES OF THE NEW SHARPLES C-41 SUPER-D-HYDRATOR ON REPRESENTATIVE SLURRIES.

AMMONIUM SULFATE—a relatively large free-draining inorganic crystal . . .
20-24 tons/hour

"CAUSTIC SALT"—a relatively small, slower draining crystal requiring high efficiency rinsing . . .
13-16 tons/hour

POLYPROPYLENE—typical of extremely fine, slow draining, low bulk density organic solids . . .
1.0-2.5 tons/hour

The C-41 Super-D-Hydrator is the largest of 3 high efficiency crystal drying centrifuges by Sharples (C-20;C-27;C-41) which are designed for both atmospheric and pressurized operation, and are available in various standard materials of construction.

Sharples engineers have incorporated many innovations in the design of the new C-41, learned in over 40 years experience in the chemical industry, and are further prepared to give special design consideration to each specific problem. May we consult with you regarding your separation problems?

SHARPLES

THE SHARPLES CORPORATION
2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO •
• LOS ANGELES • SAN FRANCISCO • HOUSTON • ST. LOUIS • ATLANTA
Associated Companies and Representatives Throughout the World

Check 3086 opposite last page.

and cloth washing are accomplished by means of roller mechanism and jet spray apparatus mounted on front of filter.

Cake breaks cleanly and completely from filter medium when cloth is subjected to sharp change in radius of curvature of discharge role (see drawing). At discharge point, flexing of cloth tends to extrude cake lodged in interstices of the cloth weave.

Sprays Scour Filter

After cake discharge, filter medium passes through washing zone. Jet sprays scour off any particles of cake that may still adhere to cloth. Filter medium is thoroughly washed, front and back, with either periodic or continuous wash sprays. Chemical washes may be introduced, if needed, through spray pipes. Cloth returns to drum completely clean.

Spray controls are conveniently located to enable operator to adjust amount and force of sprays. Many slurries can be filtered with only periodic rinses. There is no possibility of wash water contaminating feed liquor or filtrate, since medium is washed while away from drum. Wash water is carried off in wash trough.

Avoids Wrinkling

An electro-pneumatic mechanism assures proper alignment of filter medium. It effectively overcomes any force that tends to wrinkle cloth media.

Filter can discharge cakes as thin as 1/16". Cake is efficiently discharged right up to end of run. Filter operates just as good at end of run, or at any time during a run, as at the beginning.

Vacuum levels of 20 to 26" Hg can be maintained across face of drum. An improved seal stops edge leakage and results in the most effective use of vacuum. Elimination of right angle bends in piping and filter valve also cuts vacuum loss.

Filters are available in wide variety of sizes, ranging in

diam from 18" to 14', and with faces from 1 to 14'. Filtering areas range from 4 to 615 sq ft.

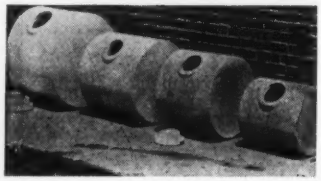
(Further information about Eimcobelt continuous belt drum filters may be obtained from The Eimco Corporation, Filter Division, 634 South 4th Street, Salt Lake City, Utah.)

Check 3087 opposite last page.

High wear resistance featured for ceramic pebble mill jars

Uses: Grinding material where iron and silica contamination is undesirable.

Features: Ceramic jars are made of high wear-resistant porcelain fortified with high specific gravity alumina for



Wide openings on ceramic mill jars facilitate loading, unloading, and cleaning

maximum density, strength, and impact resistance. Tests show silica contamination per batch is negligible on standard runs.

Description: Ceramic jars are available in straight side, neck, and Eureka Mill types. Sizes range from ½ pint to 60 gal. Wide openings simplify loading, unloading, and cleaning.

(Ceralon ceramic jars are product of Abbe Engineering Company, 420 Lexington Avenue, New York 17, N.Y.)

Check 3088 opposite last page.

Drying equipment for removing moisture from low pressure gas or air streams is described in bulletin. Curves showing percent of moisture by volume at various temperatures and dewpoint related to moisture content per 1000 cu ft of gas or air are also included. Drying Equipment Bul — Gas Atmospheres, Inc.

Check 3089 opposite last page.

Some Straight Talk On Steam Trap Capacity

...or pulling away the curtain of confusion that surrounds steam trap capacity ratings.

Unfortunately, for the steam trap buyer, the subject of steam trap capacity has become cloudy and confused by a landslide of claims, counterclaims and inconsistent "standards" for measurement. So let's take a cold hard look at this subject so vital to the efficient operation of your plant.

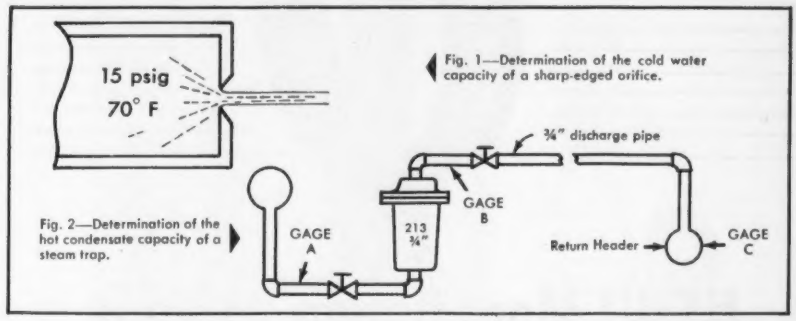


Fig. 1—Determination of the cold water capacity of a sharp-edged orifice.

Fig. 2—Determination of the hot condensate capacity of a steam trap.

What Determines Steam Trap Capacity?

There are three factors that determine the capacity of a steam trap:

1. The area of the orifice.
2. The density of the condensate.
3. The pressure differential across the trap.

Let's take a closer look at each of these:

Area of orifice is usually specified by the trap manufacturer or can be calculated from the diameter. Nothing complicated here.

Density of condensate depends on temperature. A cubic foot of cold water weighs 62.4 lbs. At 250° F. or 15 psi, it weighs less than 59 lbs. This is important. Don't overlook it.

Pressure differential across the trap is most significant. And it is complicated by the many factors that affect it, such as:

1. Pressure drop between unit drained and the trap when the trap valve is open.

2. Distance the trap valve is moved from the valve seat.

3. Back pressure on the trap with orifice closed; i.e., return header pressure.

4. Increase in back pressure produced by condensate and flash steam flowing in the discharge line. This in turn is affected by the diameter and length of the discharge line, plus friction caused by valves and fittings.

Orifice Capacity Vs. Steam Trap Capacity

Figure 1 shows a ½" diameter sharp-edged orifice at the end of a pipe filled with cold water at 15 lbs. pressure. The capacity of this orifice, using a .61 coefficient of flow would be 8,800 lbs. per hr. Now, would this ½" orifice if used in a ¾" steam trap installed as shown in Figure 2 provide the trap with a continuous discharge capacity of 8,800 lbs. of hot condensate per hour? The answer is "no". And here are some of the reasons why:

Density of condensate. As pointed out above, cold water weighs 62.4 lbs. per cu. ft. At 15 lbs. pressure and 250° F. water weighs less than 59 lbs. per cu. ft. This difference in density alone reduces the lbs. per hour capacity of the orifice by over 5%.

Pressure differential across the trap. With the trap valve closed we have a static pressure differential of 15 psi. The trap valve must be able to open against this pressure. However, this is not the pressure differential that will determine the capacity of the trap valve.

The ¾" discharge line will be full of a mixture of flash steam and condensate. To keep this mixture flowing from the trap outlet to the return line requires a pressure differential. In actual capacity tests run as shown in Figure 2 Gage B at the trap outlet registered 11 lbs. back pressure. Thus the true pressure differential across the trap was about 4 lbs. Under these conditions the measured capacity of the trap was 4,340 lbs/hr. or just about half of the capacity of the ½" orifice for cold water.

How Armstrong Determines Capacity Ratings

Armstrong trap capacity ratings are based on hundreds of tests under actual operating conditions. In these tests, the condensate used was at the steam temperature corresponding to the test pressure. Thus, the capacities determined take into account the pressure drop that occurs when the trap orifice opens and the choking effect and back pressure of the flash steam. Actual installation hookups were used so that pipe friction in both inlet and discharge lines as well was reflected in the results.

Let's go back to the example cited above and in Figure 2. The trap referred to is an Armstrong No. 213. While it did test out at 4,340 lbs. per hour for a static pressure differential of 15 psi, it is rated in the catalog at only 3900 lbs. per hour for this pressure—just to be on the safe side.

For the trap buyer, this means that Armstrong Steam Trap capacities are based on handling condensate at steam temperature for the stated static steam pressure differential under actual working conditions.

Capacity ratings which don't take into account all of the variables will be misleading and may lead to the selection of undersized traps. So whenever you specify or buy traps be sure that the capacity ratings you work from are realistic. One way to be sure is to select Armstrong Traps with *guaranteed* capacity ratings.

* * *

Additional information on trap capacity ratings, plus data on how to correctly size, install and maintain steam traps for any pressure, any temperature and any load, are presented in the 48-page Armstrong Steam Trap Book. Ask your local Armstrong Representative for a copy or write:

Armstrong Machine Works
8801 Maple Street
Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

"See our catalog in Chemical Engineering Catalog"

Check 3090 opposite last page.

NEW! Monoflange valve is guaranteed drop-tight at 150#

The Henry Pratt Monoflange MK II is a top quality butterfly valve that fits between the pipe flanges of a fluid or gas line. **It saves weight, space and labor** because it eliminates a pair of flanges and requires only one bolting operation. **It eliminates gaskets** because the faces as well as the inside of the valve body are covered with rubber permanently bonded to the metal.

Low torque makes the Monoflange easy to operate, especially with Henry Pratt's **new SIDEWINDER manual operator.** Any type of power operator can be used if desired. Structural features include streamlined disc, one piece shaft, chevron packing and Nylon bearings. Various materials available for corrosive liquids.

Standardized and mass produced, this new valve offers famous Henry Pratt quality at a new low price . . . you can't find a similar valve that offers so much in quality or performance.

Complete information available. Water and gas flow data, valve sizing, operator selection in 26 page brochure. An ideal tool for the engineer working with and specifying valves. Write for Bulletin 10-AM

Creative Engineering for Fluid Systems

HENRY PRATT®

Monoflange MK-II
RUBBER SEAT BUTTERFLY VALVE

Henry Pratt Company, 319 W. Van Buren St., Chicago 7, Ill. • Representatives in principal cities

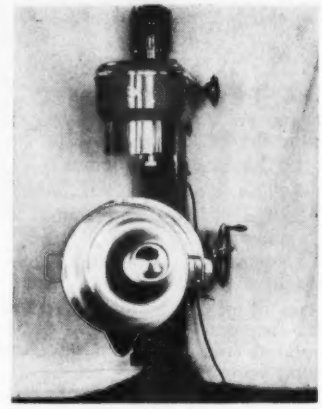
Check 3091 opposite last page.

Efficient planetary mixer homogenizes, kneads, and beats

Stirrer moves in opposite direction of bowl scraper

Uses: Homogenizing, stirring, kneading, or mixing various materials in chemical and allied industries.

Features: Patented variable planetary movement permits stirring tool and bowl scraper to move in opposite directions.



Mixer may also be equipped with tilting bowl

Description: Machine is available in eight different sizes with bowl capacities ranging from two to 30 gal. Different stirring tools permit processing large variety of materials, ranging from soft to firm masses. Bowls can be furnished made of tin-steel sheet, enameled steel, stainless steel, and porcelain. Bowls may be jacketed or equipped with either electrical or gas heating systems.

Driving gear mounted in head of machine moves stirrer clockwise along inside wall of bowl. Stirrer itself turns counterclockwise. Bowl scraper also moves counterclockwise.

Rotation of stirring bowl is caused by resistance of material being processed. Speed of bowl scraper can be changed as required.

(Further information about Herbst Electro-rapid stirrers may be obtained from Epic, Inc., 154 Nassau St., New York 38, N. Y.)

Check 3092 opposite last page.

Solvent recovery systems feature packaged design, have 85-95% efficiency

Uses: Recovering relatively low concentrations of solvents in air.

Features: Packaged solvent recovery units can remove up to 85-95% of solvent or contaminants from air stream and recover products for reuse.

Description: Equipment is available in six sizes, ranging in capacity from 400 to 4400 cfm. Exact efficiency depends upon size of unit, temperature of gas stream, and chemical nature of material to be removed or recovered.

Adsorption media is activated carbon. System can be regenerated as needed.

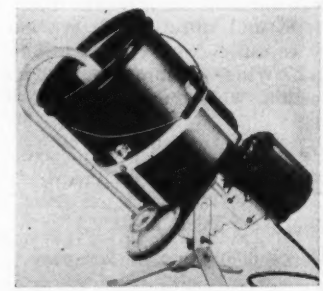
(Further information about packaged solvent recovery units, 35-36 series, may be obtained from Barnebey-Cheney Co., Columbus 19, O.)

Check 3093 opposite last page.

Versatility, easy cleaning are features of compact, 5-gal, 'do-all' mixer

Uses: Mixing small quantities of a wide variety of materials ranging from thick, viscose liquids, to fine powders.

Features: Unit is lightweight and compact, occupying only



Low-cost mixer has dual mixing paddles, can process wide range of materials

er is designed for use with two sq ft of floor space. Pail can be adjusted to four different angular positions to achieve desired agitation results.

Description: Low-cost mix-

standard 5-gal pails. Two separate paddles produce maximum horizontal and vertical circulation for fast and complete mixing.

Machine weighs 39 lbs, has ¼ hp motor. Removable paddles and mixing pail (any conventional 5-gal mixing pail will serve as extra mixing drum) permit easy cleaning. Mixing angles can be changed by just a touch of the toe.

(Mixal model 60C mixer is product of Kol, Inc., 2323 Ellis Avenue, St. Paul 14, Minn.)

Check 3094 opposite last page.

Improved gear drive lends quiet operation to vertical mixers

Practically noiseless operation is reported for vertical mixers equipped with improved gear drives. Gear sounds have been reduced to a point where normal conversation is possible even in multiple installations and confined areas.

The drives feature case-hardened precision-ground gears for maximum load-carrying capacity and long life. Running-in periods with resulting wear are said to be unnecessary. Vibration is minimized.

Vertical fluid mixers equipped with these drives are available in standard sizes ranging from 1 to 200 hp. Larger units up to 500 hp can also be supplied. Mechanical seals or packed stuffing box may be specified. Paddle or turbine-type impellers are available.

(Vertical fluid mixers are product of Philadelphia Gear Corporation, 3620 "G" Street, Philadelphia 34, Pa.)

Check 3095 opposite last page.

HAVE YOU A PRESSING PROBLEM?

Bauer Pressafiners are high pressure precision machines engineered specifically for the expression of moisture or other fluids from various materials. Stainless steel construction permits processing of highly corrosive or toxic materials.

Write, wire or telephone for full details.

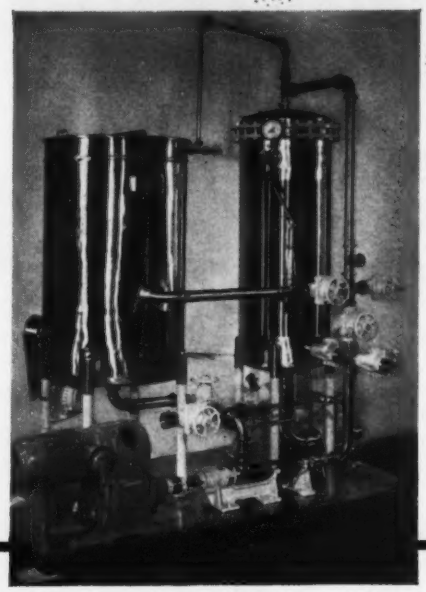
Bauer

THE BAUER BROS. CO.
1728 SHERIDAN AVENUE • SPRINGFIELD, OHIO

Check 3096 opposite last page.

NEW CROLL-REYNOLDS CLARITE FILTER

speeds Liquid Lustre-Creme filtration, is easy to clean



Mr. Joseph Mercadante, Project Engineer in Charge, Colgate-Palmolive Company

Existing Colgate-Palmolive filter units used to develop the new Liquid Lustre Creme product were found inadequate for regular production. Medium was very viscous, production requirements high. Starting with a basic ClaRite Filter, Croll-Reynolds engineered a filter capable of handling a viscosity of 900 cps or more, at a rate of about 500 gallons an hour.

ClaRite Filter Station works quite simply: A charge of diatomaceous earth and Liquid Lustre Creme is put into pre-coat tank (left), then recirculated through filter chamber (right). When filter membranes are fully precoated, the unit is put on stream. The variable speed, positive displacement pump shortens precoating time and makes filtration more efficient.

Special disconnect couplings make cleaning and sterilization possible in minutes. Everything is of Stainless Steel—tanks, pump, fittings, valves.

As you can see the only thing standard about a ClaRite Filter is its name. It comes in a wide variety of materials, several types of elements with filtration areas from 5 to 500 sq. ft. It can be engineered to solve almost any filtration problem when we have the facts in hand. Information explaining the ClaRite concept with application case histories, is available on request

Croll-Reynolds Engineering Co., Inc.
17 John Street, New York 38, N. Y.
Representatives in Principal Cities

Check 3097 opposite last page.

EC&M *Fuseless* AIR-BREAK STARTER GIVES Certified 100/150 MVA FAULT PROTECTION

NO SINGLE PHASING FROM BLOWN FUSES!

NO COSTLY REPLACEMENT FUSES TO STOCK!

- ✔ Gang-operated Disconnect Switches Grounded for Safety in Open Position. Mechanically Interlocked with Contactor... Never Open Under Load
- ✔ No Fuses. Bus Bars Throughout
- ✔ 3-way Door Interlock. On, Off and Open—with Positive Interlocking between Door, Disconnect and Contactor for Maximum Personnel Protection
- ✔ Heavy-duty DC Operating Magnet. No Chatter—No Hum

FRONT ACCESSIBLE WITHOUT ROLL-OUT!

Phase barrier and arc-chutes slide out. All starter parts exposed and accessible for easy inspection and maintenance

Get the complete story on certified fuseless fault protection for high-voltage motor drives. Write for Bulletin 8130A

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

wherever electricity is distributed and controlled

2635

Check 3098 opposite last page.

NEW LITERATURE

Processing Equipment

Wood-flour processing is described and uses cited in four-page Bul I-48 — Sprout, Waldron & Co., Inc.

Check 3099 opposite last page.

Processing equipment, tank cars, and corrosion-resistant coating are summarized in 20-page General Cat 1960 — General American Transportation Corporation.

Check 3100 opposite last page.

Ovens, both batch and continuous, for industrial processes are presented in six-page Bul 159 — Hevi-Duty Electric Company, division of Basic Products Corp.

Check 3101 opposite last page.

Heat-exchanger tubes are subject of eight-page folder which compares attributes of welded steel and seamless steel tubing. TB-431 — Tubular Products Division of The Babcock & Wilcox Company.

Check 3102 opposite last page.

Chemical process and heat exchange equipment are outlined in eight-page catalog. Manufacturer's organization and engineering facilities are also depicted. Bul 820 — Manning & Lewis Engineering Co.

Check 3103 opposite last page.

Clarifiers and thickeners are subject of six-page brochure. Drawings and data for bridge-supported and center-post designs are included. Bul WC-123 — Graver Water Conditioning Co.

Check 3104 opposite last page.

Spiral-finned heat exchangers for air and gases are described in four-page illustrated bulletin. Several arrangements are pictured. Bul 11R — Schutte and Koerting Company.

Check 3105 opposite last page.

Vibrating ball mills for pulverizing, micronizing, and mixing wet or dry materials are discussed in four-page bulletin. "Vibratom Vibrating Ball Mills" — Schutz-O'Neill.

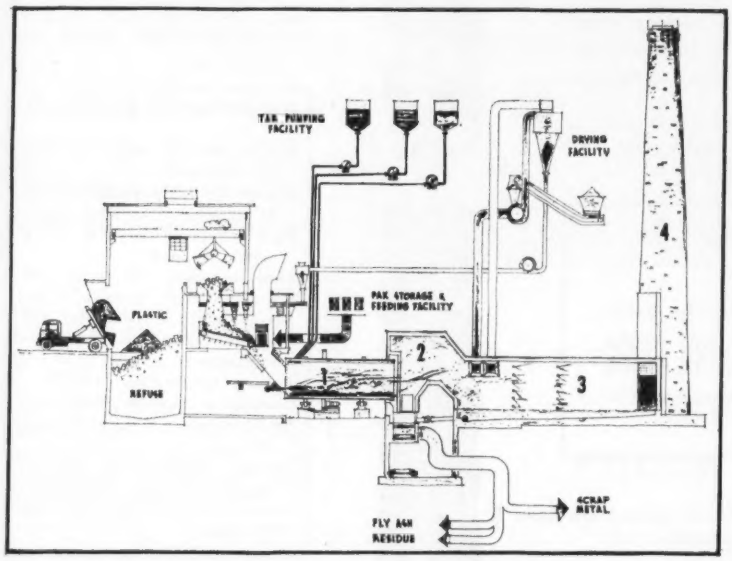
Check 3106 opposite last page.

Pressure equipment, including valves, fittings, reactors, and pumps for pressures up to 100,000 psi, are depicted in Pressure Equipment Booklet — Pressure Products Industries, Inc.

Check 3107 opposite last page.

Trash burning on a big-time scale

Industrial waste disposal is rapidly moving out of the 'sideline' category. Latest example: Dow Chemical's recently dedicated waste-incineration facilities, which could handle refuse requirements of a city of 70,000 and are designed to keep air pollution at a minimum.



Concept

Heart of waste-incineration facilities is furnace (1) which incorporates two rotary kilns. Here, primary combustion takes place of tars, solid refuse, waste plastic, and drums of solid or semi-solid material. Tars are pumped-in. Waste in containers is handled by pak storage and feeding facility.

Secondary combustion chamber (2) permits complete burning of refuse and also burns out odors. Hot gases pass from this chamber through water sprays (3), which knock down any fly ash before clean gases are discharged into atmosphere through stack (4).

Drying facility has yet to be constructed. It will draw heat from secondary combustion chamber to dry wet sludge or solid material from waste-treatment plant. Remaining dry solids will then be fed to kilns for burning.

Realization

Waste-incineration facilities cover area of six acres. With two kilns operating, plant can dispose of ½ million lb daily of refuse and tars, or 250 tpd

Designed to greatly reduce air pollution, the recently dedicated waste-incineration facilities at the Midland Division of Dow Chemical Company, are the third phase of waste-treatment equipment which will cost $9¾ million when completed.

A $5 million biological-waste-treatment plant for handling water and a $2½-million brine-wastes unit have been in operation for some time.

The waste-incineration installation actually was conceived as three units, one of which has yet to be installed. First is stationary liquid-tar furnace. This has been in operation since November 1957. Tars are liquid wastes, including byproducts, contaminated chemicals or non-reclaimable bad batches.

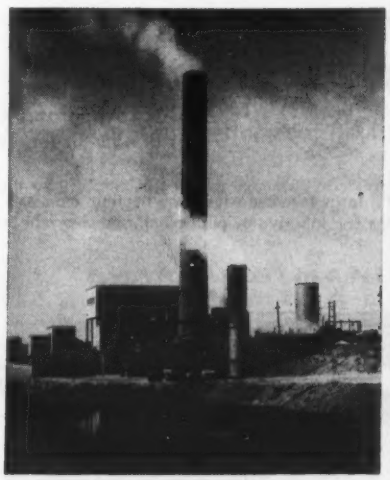
Second unit is rotary-kiln furnace. Two rotary kilns are each 13′ in diameter and 35′ long. They are designed to burn at temperature of 1800°F.

Minimum Air Pollution

Two features help eliminate heavy black smoke and reduce air pollution to minimum — controlled feeding and secondary combustion. Operator can control both feed rate into kilns and mixture of materials being fed.

Secondary combustion chamber allows complete burning of refuse and also burns-out odors. Hot gases pass from this chamber through water sprays. Sprays knock down any fly ash before clean gases are discharged to atmosphere.

Third unit has yet to be installed. This will be a drying facility which passes heat from secondary chamber to



Now!

Double-element laboratory type Glas-Col heating tapes

This heating tape is especially designed for laboratory use . . where the tape must be applied and removed frequently. BOTH of the parallel leads of heating elements terminate at the SAME end of the tape so that a heater cord can be attached easily.

The heating elements in these tapes consist of two Nichrome ribbons running parallel to each other with an insulated space between them . . each ribbon is covered with glass braid and then with a tough, pliable silicone rubber. The tape can be attached to steel pipe by small magnets, or tied to glass tubes.

Waterproof: If water is spilled on Glas-Col heating tapes, the possibility of shorts and electrical shock to laboratory personnel is eliminated.

Flexible: Glas-Col heating tapes are extremely flexible. They're only 1/16" thick, yet are very tough and durable.

Uniform heating: Glas-Col laboratory type double-element heating tapes* produce a uniform heating pattern.

No burnouts: Nichrome heating elements will not burn out even when used far beyond assigned wattages. Glas-Col tapes are tested at 1000 volts for electrical breakthrough. They'll give years of service when used below 480°F which is the temperature limit of the tape's silicone rubber covering.

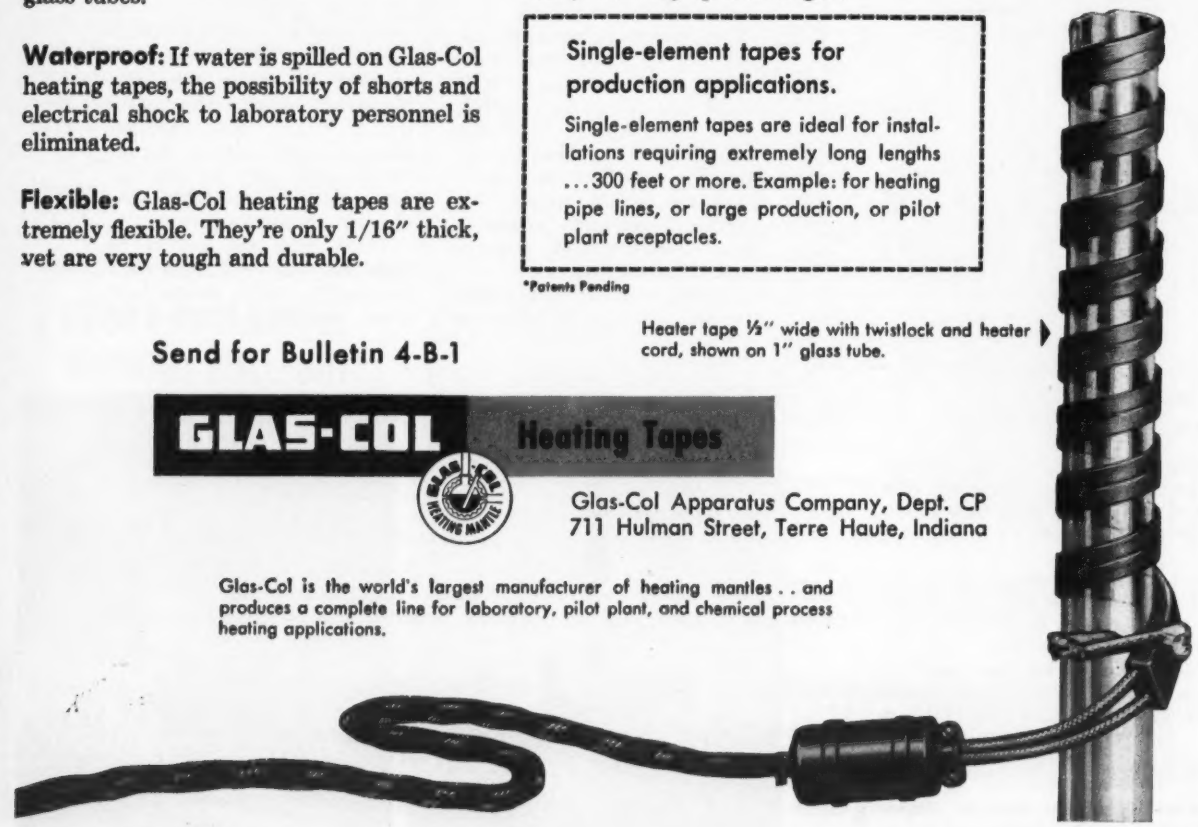
Available in ½" and 1" widths, in standard lengths from 4 to 40 ft with plug and cord, or in any special length.

Single-element tapes for production applications.

Single-element tapes are ideal for installations requiring extremely long lengths . . . 300 feet or more. Example: for heating pipe lines, or large production, or pilot plant receptacles.

*Patents Pending

Heater tape ½" wide with twistlock and heater cord, shown on 1" glass tube.



Send for Bulletin 4-B-1

GLAS-COL Heating Tapes

Glas-Col Apparatus Company, Dept. CP
711 Hulman Street, Terre Haute, Indiana

Glas-Col is the world's largest manufacturer of heating mantles . . and produces a complete line for laboratory, pilot plant, and chemical process heating applications.

Check 3108 opposite last page.

dry wet sludge or solid material from the waste-treatment plant. Remaining dry solids will then be fed to kilns for burning.

A variety of waste-disposal techniques have been and are being used by Dow engineers. Currently, some 700 acres are set aside for land-fill disposal of solid, non-burnable wastes.

This method has proved to have certain inherent limitations. Some types of waste cannot be handled in such manner, due to dangers of ground-water contamination, fires and odors. Space is another limiting factor. For example, because of rapid plant expansion, one mass of tar had to be unearthed and moved three separate times.

Waste water is handled by a biological-treatment plant. This installation neutralizes and settles waste water and then biologically oxidizes it on trickling filters and in an activated-sludge unit. Plant discharges 65 million gpd of usable water into a nearby river.

INCINERATOR STATISTICS

- Refuse pit: 20' wide, 54' long, 20' deep
- Crane: 3½ ton capacity, 52' lift, 84' runway, 2 cu yd bucket
- Feed hopper: 22½ sq ft at mouth, 7' deep
- Feed conveyor: 39' long, 4'8" wide, 7" high, speed of 1 fpm
- Rotary kiln: 13' diameter, 35' long, 4400 cu ft capacity, 1 rpm rate
- Burning temperature: 1800°F
- Combustion chamber: 3100 cu ft
- Spray chamber: 8' wide, 14' high, 41' long
- Residue conveyor: 4' wide, 2 strands 250' long, 15 fpm speed
- Residue area: 8' wide, 81' long, 13' deep

To keep water odor-free and safe, engineers have found that they must avoid and minimize contact with certain organic-waste materials which could be contaminating. These wastes must be separated from the water and mixed with other material which can be destroyed by incineration.

Closely related to water waste is brine, a basic raw

material which becomes a waste product itself once the usable elements have been removed. Approximately 400 acres are devoted to storage and settling of processed brines before filtration and pumping to sub-surface wells.

Best solution to major waste-disposal problems, however, has proved to be incineration. Original incineration facility at Dow was hand-stoked vertical incinerator for solid waste tars. In 1948 a rotary kiln was installed to handle these tars, refuse, paper, boxes, and drums of chemicals. Kiln could handle 50 tons of refuse daily.

Problems presented by this process were safety of operation, stack effluent as source of air pollution, and lack of capacity (as plant continued to expand). These considerations led to construction of new incinerator plant described above.

(Rotary-kiln furnace was designed by International Incinerator Company, Atlanta, Ga.)

Check 3109 opposite last page.

Lubrication no problem in 1900°F kilns, ovens

Uses: Lubrication for objects exposed to heat in drying ovens and kilns.

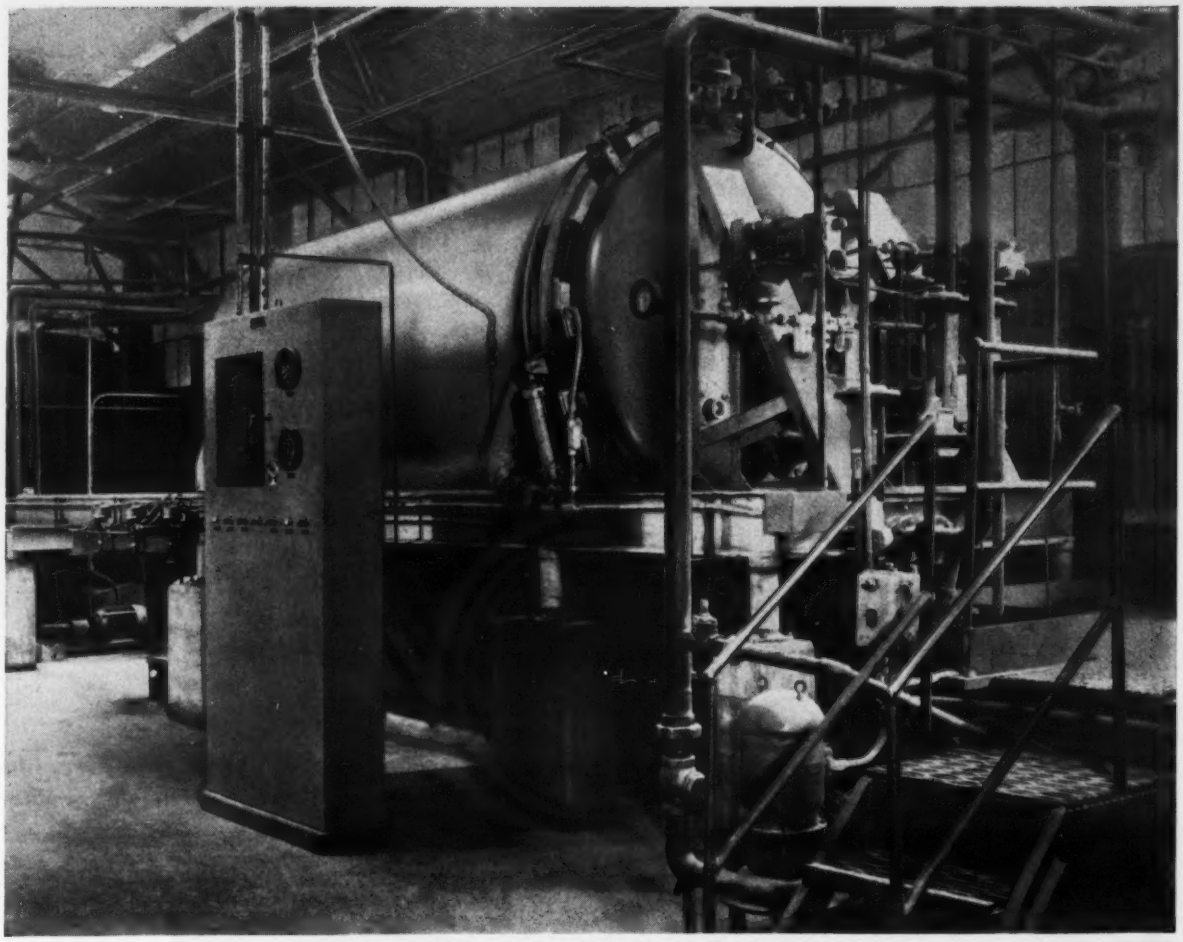
Features: Lubricant will withstand heat to 1900°F.

Description: Aluminum-magnesium-silicate lubricant is soft tan powder. It is compatible with all forms of petroleum and can be processed into workable solutions.

Product forms micro-thin sheet-like layers of natural lubricant between fluid-film of oil and metal surface. Because of affinity to metal, first layer of lubricant bonds itself to metal surface. Molecular structure causes other layers to slide horizontally across bonded layer. Lubricant is impervious to acid.

(Almasol 1250 lubricant is product of Lubrication Engineers, Inc., 2809 Race Ave., Fort Worth, Tex.)

Check 3110 opposite last page.



Model MCRS—1120 sq. ft. With Automatic Controls

THIS FILTER OPERATES CONTINUOUSLY UNATTENDED

SPARKLER FILTER

FULLY AUTOMATED Model MCRS

This 1120 sq. ft. filter operates itself automatically throughout the entire cycle of precoating, filtering, blowdown and cake discharge; and duplicates the cycle repeatedly, unattended.

The Sparkler exclusive patented plate design, with a free flow, 100% supported mesh, is an important factor in the remarkable efficiency of this large completely automated filter.

Contact your local Sparkler representative or write.

SPARKLER FILTERS

SPARKLER MANUFACTURING CO.
MUNDELEIN, ILLINOIS U. S. A.

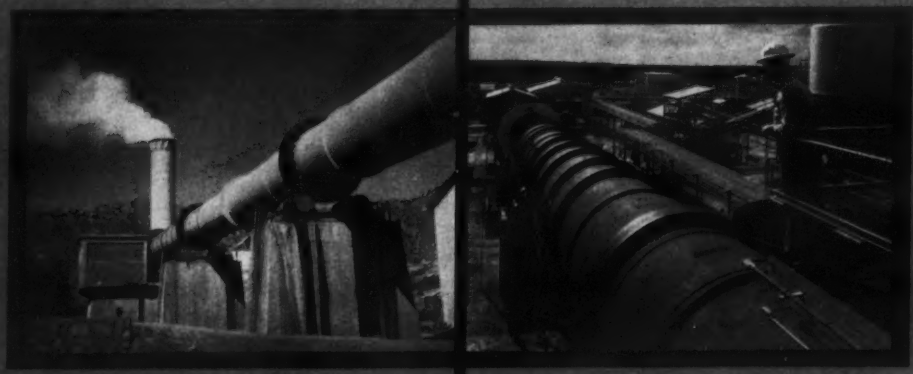
Sparkler International Ltd., Manufacturing Plants at Leliegracht 9, Amsterdam, Holland; Toronto, Ontario, Canada; Italy and Australia.

FILTRATION ENGINEERING AND MANUFACTURING EXCLUSIVELY FOR OVER 35 YEARS.

Check 3111 opposite last page.

Traylor-made rotary kilns

Known the world over for dependable efficient operation, Traylor Engineers are your guarantee of machinery designed to meet your needs.



8'-0" x 150'-0" Rotary Kiln in a portland cement plant.

12'-0" x 325'-0" Rotary Kiln in a chemical plant.

Shown above is a Traylor Kiln in a chemical processing plant where its efficiency and economy are demonstrated 24 hours a day. For precision-built and rugged machinery, call on Traylor Engineers today. Write for Bulletin No. 1115 for more on Traylor Kilns.

Traylor

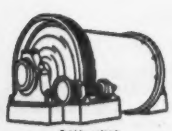
TRAYLOR ENGINEERING & MFG. DIVISION OF FULLER CO.

1507 MILL ST., ALLENTOWN, PA.

Sales Offices: New York — Chicago — San Francisco

Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P.Q.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

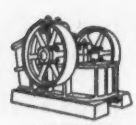


BALL MILLS

ROTARY KILNS

APRON FEEDERS

PRIMARY GYRATORY CRUSHERS



JAW CRUSHERS

SECONDARY GYRATORY CRUSHERS

Check 3112 opposite last page.

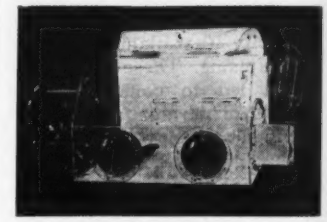
One-piece construction from chemical weld in glove boxes

For leak-proof performance, O-ring seals are used

Uses: Glove-box applications.

Features: Units utilize chemical weld for one-piece construction. Positive O-ring seals are incorporated throughout for leak-proof performance. Full 18" diam side opening affords convenience.

Description: Each plastic glove box incorporates opaque white background, sealed interchangeable circulating and filter system, filter which may be removed and installed without disturbing system, interchangeable 12" diam, 12" long air lock with covers, and covers for gloves.



For convenience, plastic glove box incorporates full 18" diam side opening

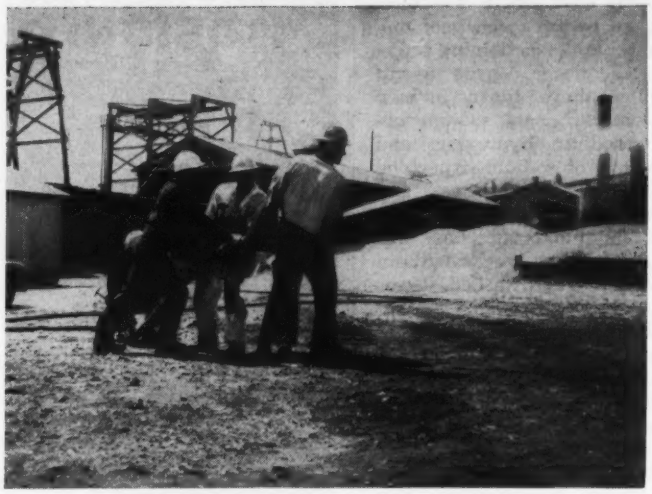
Other design features include manifold that uniformly distributes flow from circulating system; internal removable shelf for storage; plastic diffuser on fluorescent light; external switches on all controls; and toggle valves for preconditioning of system, air lock and filter.

(Plastic glove boxes are product of Manostat Corporation, 26 N. Moore St., New York 13, New York.)

Check 3113 opposite last page.

CORRECTION

In the article, "Lubricated plug valves shut off safety hazards," which appeared on pages 186-88 of the November, 1959, CHEMICAL PROCESSING, "Gantrisin®," a product of Hoffmann La-Roche Inc., Nutley, N. J., was incorrectly spelled as "Gantrisan®."



Before this Dacron-jacketed neoprene fire hose was accepted for duty, it was subjected to gruelling tests

Corrosive atmosphere, rugged terrain and wide temperature variations, at an Idaho pulp and paper mill, combine to provide a rugged test for fire hose. In spite of all this, for the past four years . . .

fire hose holds firm under corrosive attack

At the Lewiston, Idaho, pulp and paper mill of Potlatch Forests, Inc., a three-pronged four-year assault, of corrosive substances, wide temperature variations, and rugged gravelly ground, has failed to put 600′ of neoprene fire hose out of commission.

The hose incorporates a 2½″ neoprene tube, jacket of Dacron and cemented neoprene cover. In four-year period, without any maintenance, hose has served without blowouts or other failures. During this time it has been utilized to fight blazes once or twice per year.

Area of hose use contains lime rock, salt cake, acids and caustic black liquor. Outdoor humidity turns salt cake on hose into corrosive substances. Ground is gravelly and criss-crossed by railroad tracks. During the four years of its use, hose has never been washed or refolded in sheds (which are open around bottom, without any floor).

Weather is another detrimental environmental factor. This section of the Northwest is characterized by rapid, extreme temperature variations. Quick changes in humidity may also be expected.

Tough Testing Conditions

Prior to being accepted for duty at Potlatch, hose was subjected to a series of rugged tests. It was first put on outside sprinkler system. Conditions were 125-psi working pressure for six weeks on six-hours-per-day, seven-days-per-week basis. After this, it

LEE PRODUCTS
For Reduced Processing Costs

Write for bulletins on any of the products illustrated.

LEE
METAL PRODUCTS COMPANY, INC.
ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE.

Kettles, Plain and Jacketed | Tanks, Processing and Storage | Agitators and Accessories | Vacuum and Pressure Equipment

418 PINE STREET, PHILIPSBURG, PA.

Check 3114 opposite last page.

still performed without mishap at 300 to 400 psi.

Same hose length was then hitched to top opening of one of mud tanks containing pulp-mill chemicals. Agents in and around these tanks include sodium carbonate, sodium sulfide, sodium hydroxide, end products of sodium hypochloride, free chlorine gas and chlorine dioxide. Following eight-hour exposure, hose was stored for two weeks without washing. When washed, it was still serviceable.

Several years ago, 100' section of hose was damaged by flame. One section was salvaged as filler hose on a fire truck. Remaining portion, more severely damaged, was vulcanized in experiment to determine repairability. This piece of hose has been used extensively and is still serviceable.

(Petrochem fire hose is product of Thermoid Division, H. K. Porter Company, Inc., Tacony and Comly Streets, Philadelphia, Pa.)

Check 3116 opposite last page.

(Petrochem hose is made of neoprene and jacketed with Dacron. Dacron polyester fiber and neoprene are products of E. I. du Pont de Nemours & Company, Wilmington 98, Delaware.)

Check 3117 opposite last page.

Full face, chin protection while working

Uses: Protection of face and chin while working with flying particles and/or chemicals and paints.

Features: Helmet offers top-of-head, full-face and chin protection.

Description: Safety helmet has combination acetate face protector and soft vinyl hood and bib. Head gear is interchangeable. It is made with lightweight plastic with aluminum-spring pivots on each side to give even tension for comfort. Headband is adjustable for marked sizes of 6 to 8.

Face protector is made of optical plastic. Plastic beading protects wearer from any rough edges of shield. Soft

Photographs shows an Ajax Lo-Veyor installed out of the way below the floor. Floor grids similar to those shown in foreground removed to show arrangement of combination conveyor pan and screen.

AJAX Vibrating Conveyors
Do Two Or More Jobs

for price of one machine

With today's skyrocketing costs, the importance of reducing non-productive expense was never more urgent. Large and small plants are saving money in first cost, processing cost, and maintenance cost with Ajax Lo-Veyors engineered to fit your requirements.

Photograph shows an installation designed to simplify and speed up handling and separating bulk materials flowing from 10 production lines.

Send for latest AJAX SELECTION GUIDE

Learn how Ajax Vibration Engineering Service can help you cut your costs. Phone, write, or send coupon for your copy of this helpful book.

AJAX

AJAX FLEXIBLE COUPLING CO. INC.
24 Portage Road, Westfield, N.Y.
In Canada—The Alexander Fleck, Ltd., Ottawa

Please send Ajax Lo-Veyor Selection Guide to

Name_____

Concern_____

Address_____

Check 3115 opposite last page.

New!
ELGIN Junior 120* DEIONIZER

For:
Laboratory
Research
Commercial
Industrial uses

Delivers up to 120 GPH of *high quality deionized water

Now a deionizer that fills a long felt need — a unit for those whose needs are not great enough to justify a large deionizer, but too great to be handled by small, portable laboratory apparatus. It gives you high quality water comparable to that produced by the Elgin mixed-bed Ultra Deionizer — water actually freer from mineral impurities than distilled water . . . at continuous flow rates up to 120 gallons per hour, and at remarkably low cost!

Illustration tells story. This compact unit — only 45" high — comes to you complete and ready to go. Hooks right into your water supply line. Delivers demineralized water under line pressure any place you want it. Handsome stainless steel cylinder contains four bags of resin ion exchange material that does the work. When resistance of effluent falls below 50,000 ohms (the measure of commercially distilled water) built-in ohm meter actuates pilot signal and you replace spent material with fresh bags which are supplied right with the unit. Then you return the exhausted bags to Elgin in convenient shipping container which we furnish. We then promptly regenerate it and return it to you so that *you always have a fresh supply on hand . . .* a planned and organized service. There is: —

No regeneration — no acid or alkali to handle — no backwashing — no drain needed — no trained operator required. Our well organized resin exchange service does the whole job for you. Cost of equipment and service is low. Final result: continuous supply at way below distilled water costs.

Write for facts

ELGIN SOFTENER CORPORATION
180 N. Grove Ave., Elgin, Illinois
Representatives in principal cities
In Canada: G. F. Sterne & Sons Ltd., Brantford

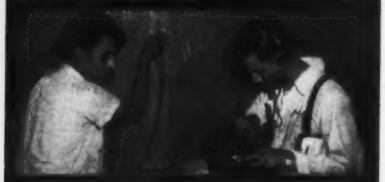
Check 3118 opposite last page.

BRANSON

Ultrasonics at work . . .

CORROSION SURVEYS and FLAW DETECTION

AUDIGAGE® 6 — the new miniaturized, self-powered "mighty midget" Thickness Gage and Flaw Detector. Ideal for corrosion surveys by one man in awkward locations. Weighs less than 5 pounds complete. Uses new high-sensitivity, high-resolution **Type Z** transducers, flat or curved, in various mounts for every application. Measures directly in inches between 0.09" and 5.0". **BULLETIN A-201.**



AUDIGAGE® 5 — the standard self-powered instrument for field corrosion surveys when greater range or accuracy than Model 6 are required. **BULLETIN A-2.**

VIDIGAGE® 14 — the high-accuracy, high-speed, ultra-sensitive gage with a 14" CR tube. Range 0.005" to 2.7" with accuracies to 1/10 of 1%. Interchangeable oscillators and direct-reading scales. Extension cables and intercom phones for remote testing up to one-fifth mile from the basic instrument. **BULLETIN V-200.**

SONORAY® 5—the new portable, high-performance pulse-echo Flaw Detector for testing weldments, shafts, plates, etc., and detecting other internal flaws. Only 37 lbs., 7½" x 11" x 20¼" long. **BULLETIN T-203.**

Send Coupon to **BRANSON INSTRUMENTS, INC.**
51 Brown House Road, Stamford, Connecticut

BRANSON: Send Bulletin **A-201, A-2, V-200, T-203.**

NAME_____

FIRM_____ DEPT._____

ADDRESS_____

Check 3119 opposite last page.

hood and bib are snapped into top and bottom of face protector by means of plastic bands equipped with snap buttons.

Entire unit weighs less than seven ounces. It is available with either white or black unbreakable headgear.

(Face shield and chin protector is product of Paulson Mfg. Corp., Fallbrook, Calif.)

Check 3120 opposite last page.

Cold chlorinated stripper can be diluted

Uses: Stripping of baked synthetic enamels. Removal of epoxy coatings from most metals, including steel, aluminum, copper, brass and zinc die castings. Also, for stripping of plastisol coatings from racks.

Features: Stripper can be diluted with up to 20 parts-by-volume of water and still function adequately.

Description: Cold chlorinated liquid stripper is acidic and non-flammable. Since stripping solution wrinkles, but does not dissolve coatings, it does not become contaminated with dissolved enamel. This lengthens solution's life.

(Stripper S-26 is product of Enthone, Incorporated, Subsidiary of American Smelting and Refining Company, New Haven, Conn.)

Check 3121 opposite last page.

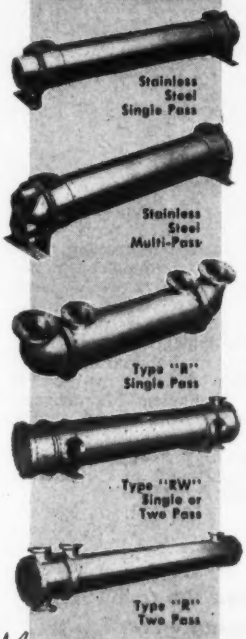
"I just asked him if he knew what'n hell he's doing?"

NEW *Young* 4-Pass SHELL and TUBE *Heat Exchangers Cut Water Usage up to 75%*

Typical Young 4-Pass Heat Exchanger used to cool hydraulic fluid in automation equipment

Where critical water shortages, and high water rates are prime factors, specify the new Young 4-Pass water-conserving Heat Exchangers. The same amount of water in gpm through the Young 4-Pass Heat Exchanger would increase the velocity in ft./sec. four times, requiring just one-quarter the water flow of a single-pass heat exchanger to obtain the same velocity. Between 50 to 100 models are available from stock for immediate delivery. Write for Catalog No. 1258A.

FULL LINE OF LOW COST HIGH PERFORMANCE HEAT EXCHANGERS



MORE THAN 230 Standard Fixed and Removable Bundle MODELS IN STOCK

Whatever your heat exchanger requirements may be, there is a Young Heat Exchanger to meet the demands of every cooling, heating or condensing application. Over 230 standard units fit the operating requirements most frequently specified and are readily available.

Other units are available incorporating the use of cupro-nickle, muntz metal, naval bronze, stainless steel or any combination of metal required.

AIR-COOLED HEAT EXCHANGERS

Young designs and builds all types of Horizontal and Vertical Core Air-Cooled Heat Exchangers for cooling and temperature control of; oil, water, or gases, and for condensing vapors.

Write for catalogs describing the type you desire.

Young *ideas for solving heat transfer problems are GOOD IDEAS*

YOUNG RADIATOR COMPANY DEPT. A-480 RACINE, WISCONSIN

PLANTS AT RACINE, WISCONSIN AND MATTOON, ILLINOIS

Check 3122 opposite last page.

big

ONE PIECE TEFLON GASKETS

Custom made to your specifications

An exclusive Dore' quality control technique enables us to pressure fuse solid Teflon Gaskets in any diameter, flange width and thickness. You are not restricted to the 48" O. D. gaskets cut from flat sheets of Teflon or required to dovetail or overlap several segments when larger gaskets are necessary. You can now get one piece gaskets in 7', 8', 12' and larger diameters, with flange width and thickness as required. All tolerances on these gaskets are closer than on those cut or stamped from flat Teflon sheets. The pressure fused joints are as smooth and strong as the original molded Teflon. Considerable savings can be made on fused gaskets under 48" as compared to gaskets cut from sheet.

In addition to plain round styles, these "Big" gaskets are available with cross members in any pattern. Send us drawings or description of your "Big" Teflon gasket requirements for specific recommendations and quotations.

Write for Bulletin A-59.

FLUOROCARBONS DIVISION SPP

John L. Dore' Co.

5406 Schuler • P. O. Box 7772 • Houston 7, Texas
Export: 1505 Race St. • Philadelphia 2, Pa., U.S.A.
Cable Address: DOREX

Check 3123 opposite last page.

ENGINEERING & SAFETY

After-installation painting of insulation jacketing is avoided

Aluminum jacketing, with factory-baked enamel-color finish was used over insulation on practically all process vessels and pipelines in The Superior Oil Company's Lowry gas-processing plant near Lake Arthur, Louisiana.

Approximately 25,000 lb of the aluminum, in 0.016 and 0.024" gage, was used in the application. All painting of insulated process pipes and vessels on site was thus eliminated.

Hudson Engineering Corporation of Houston, designed and constructed the plant. They estimated that application of pre-finished colored aluminum jacketing would be more economical than installation of any type of unpainted metal jacketing, with subsequent painting on site. Fuller-Austin Insulation Company of Houston installed the jacketing.

(Colorweld aluminum is product of Reynolds Metals Company, 2591 S. Third St., Louisville 1, Ky.)

Check 3124 opposite last page.

Equipment maintenance is topic of recent Air Force report which considers factors in making decisions to: leave equipment alone, have one man service it or have series of men service it. Foundation of analysis is probability theory. Equipment and repairs are considered to be Markov processes. This 41-page report, PB 151683, "Equipment Maintenance with Various Numbers of Service Men: A Simple Analysis," is available at $1.25 per copy from OTS, U. S. Department of Commerce, Washington 25, D.C.

Sand and silt squelched in pumping water from streams

Uses: Straining water drawn from streams, ponds and sumps by pumps.

Features: Water is drawn from just below surface, so as to avoid intake of either sand or silt from bottom, or float-

H&B ESTABLISHED 1887

Jacketed Spring Loaded
PLUG VALVES

- 2-WAY OR STRAIGHT SPRING LOADED
- 3-WAY SPRING LOADED
- ANGLE SPRING LOADED
- AIR CYLINDER OPERATED SPRING LOADED—*all sizes and types*

LONG ON SERVICE . . . SHORT ON MAINTENANCE

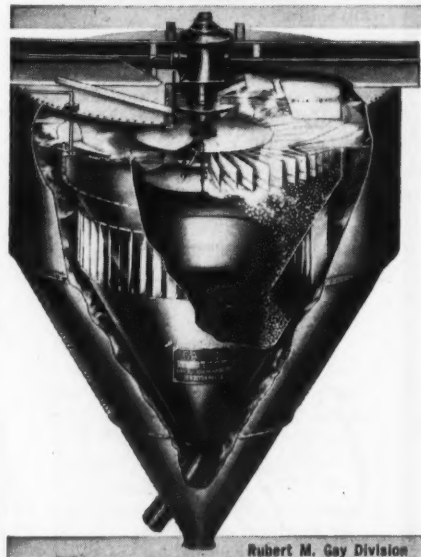
H & B's new fully jacketed spring loaded plug valves feature an inverted tapered plug inserted and lapped into the housing from the bottom of the valve—then spring loaded. The spring wedges the plug to a perfectly tight seal, eliminating troublesome leaks. Easy to operate—no big handwheel . . . no freeze . . . no "breaking loose" necessary. Easy to clean. Made in two port or multi port design, with any special stop arrangement desired.

Bulletin J-57 sent on request

HETHERINGTON & BERNER INC., 711 Kentucky Ave., Indianapolis 7, Ind.

Check 3125 opposite last page.

USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR



GAYCO
CENTRIFUGAL AIR SEPARATORS

Classify practically all dry fine materials

You get:
- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

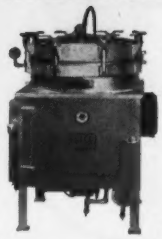
RANGE 60 to 400 mesh. Timken bearings. Choice of Standard or Heavy-Duty Models.

this helpful booklet sent on request

Robert M. Gay Division
UNIVERSAL ROAD MACHINERY CO.
117 Liberty St., New York 6, N. Y.
Factory and Laboratory: Kingston, N. Y.
In Canada: Watson-Jack Hopkins Ltd., Montreal

Check 3126 opposite last page.

YOU GET *Lower* VACUUM PUMP MAINTENANCE *Costs* and Increased Vacuum with the **HILCO OIL RECLAIMER**



HILCO OIL RECLAIMER

For complete oil reclaiming. Removes solids, acids and volatile impurities; moisture, solvents, gases, etc. by heat-vacuum process.

A simple, economical and efficient method of restoring contaminated lubricating and sealing oil to the full value of NEW OIL. The HILCO will produce and maintain oil free of solids, water, gums and acids in a continuous, all-electric, automatic operation.

Be Sure of CLEAN OIL in your HIGH VACUUM PUMPS

KEEP YOUR HYDRAULIC SYSTEM *Clean* with

HILCO HYDRAULIC OIL FILTER

No More Varnish and Sludge Deposits
No More Flushing and Manual Cleaning
No More Frequent Oil Changes
No More Accumulation of Dirt
Filter life up to a year eliminates usual frequent draining, refilling of systems.

Write for complete details in the free bulletin at no obligation . . .

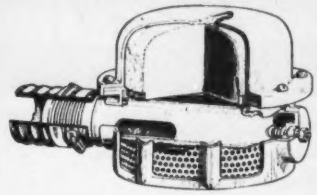
THE HILLIARD Corporation

58 West Fourth St. Elmira, N. Y.

In Canada
UPTON-BRADEN-JAMES LTD.

Check 3127 opposite last page.

ing matter from surface. Strainer precludes formation of vortexes. This is due in part to cylindrical disposition of entry holes. Second factor:



Float chamber of strainer is filled with molding of expanded polystyrene foam

Any tendency to vortex formation is automatically countered by slight sinking of strainer.

Description: Floating suction strainer is constructed from plastics and austenitic stainless steel. Tube, to which hose is directly attached, can rotate freely in the body of strainer.

Float chamber is filled with molding of expanded polystyrene foam. This provides millions of separate watertight air cells. As result, buoyancy cannot be lost due to accidental damage. Strainer is made in four sizes—for 1½, 2, 3 and 4" hose.

(Dolphin suction strainer is product of Megator Pumps & Compressors Inc., 930 Manchester Ave., Pittsburgh 12, Pennsylvania.)

Check 3128 opposite last page.

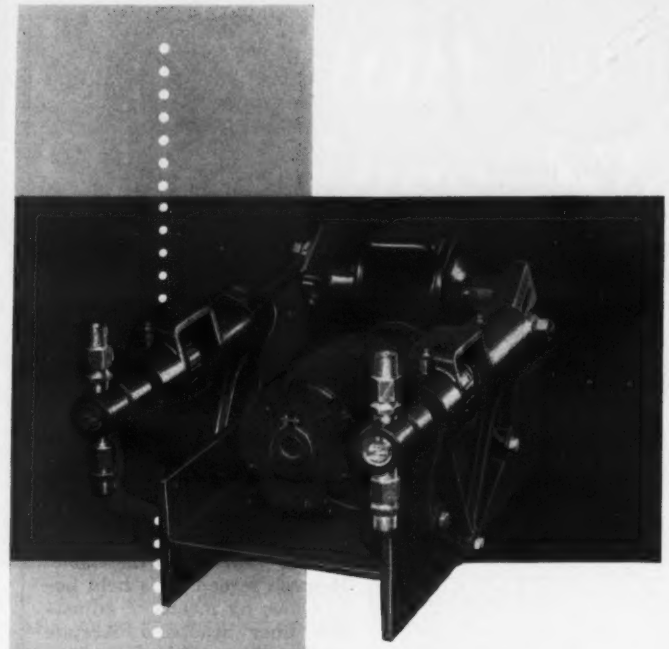
WANTED:

To Keep You Alive

Almost everyone knows of some tricky unexpected danger situation in his plant. CHEMICAL PROCESSING feels that the dissemination of such information to readers is important. Therefore a monthly series on Chemical Boobytraps is now appearing in this section. If you know of any such situation, please forward an account of it to:

Safety Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

POSITIVE CONTROL OF *MATERIALS IN MOTION* BIF METERS FEEDERS CONTROLS



ONE PUMP PROPORTIONS ALKALINE, NEUTRAL OR ACID CHEMICALS

BIF *Proportioneers* **Adjust-O-Feeder**

Gives Application Versatility At Low Initial Cost

Meet changing requirements without changing your entire pump! Low cost changeover, with plug-in reagent ends, makes Model 1140 Proportioneer® extremely versatile in the capacities and types of chemicals it can handle. Compare these performance characteristics with competitively priced pumps:

Accuracy within ±1% of set rate.
Adjustment range of 15:1 (not 10:1 as most).
Capacity from 0.8 gph to 850 gph.
Discharge pressures up to 1340 psig.

You'll find opportunities for cutting costs and improving efficiency in process feeding when you consult B-I-F — manufacturer of the most complete line of solid and liquid feeders.

B-I-F *Industries*

BUILDERS-PROVIDENCE • PROPORTIONEERS • OMEGA
METERS • FEEDERS • CONTROLS / CONTINUOUS PROCESS ENGINEERING

For complete details on Model 1140 request Bulletin 1140.20-1. Write **B-I-F Industries, Inc., 387 Harris Ave., Providence 1, R. I.**

Check 3129 opposite last page.

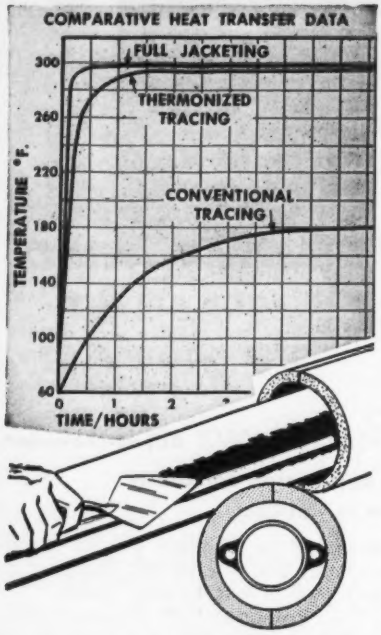
HAVE YOU TRIED

? THERMON ?

Thoroughly proved

HEAT TRANSFER CEMENT

now effecting savings up to 90% for over 1,000 users!



Thermon is a non-metallic adhesive compound with highly efficient heat transfer properties, and is easily applied over either steam traced or electrical resistance systems . . . working equally well for either heating or cooling processes.

Thermonizing has excellent heat transfer characteristics (see curves), exceeding steam traced equipment approximately 1100%, and closely approaching jacketing equipment. Thermon can be used almost without exception in place of expensive jacketing (and in many applications where jacketing is impossible), with savings up to 90%.

Write for the new Thermon Engineering Data Book 502.

THERMON
THERMON MANUFACTURING CO.
1817 Rosine • P. O. Box 1961
Houston, Texas

Check 3130 opposite last page.

Vision and ventilation

. . . are combined in this safety face shield. Shield is designed for use by industrial workers who require both visibility and face protection while working in heated areas.

Face shield incorporates acetate window in fine-metal 24-mesh screen. It is held before face by means of adjustable fiber headband. Acetate window is available in clear, green or aluminized.

(Kool-Vent face shield is product of American Optical Company, Southbridge, Massachusetts.)

Check 3131 opposite last page.

Job-site mixing avoided with caulking compound

Uses: Caulking applications.
Features: One-part compound requires no job-site weighing, measuring, mixing.
Description: Caulking compound is based on chlorosulfonated polyethylene. It is immune to attack by bacteria and vermin and does not support combustion. Physical properties are as follows:

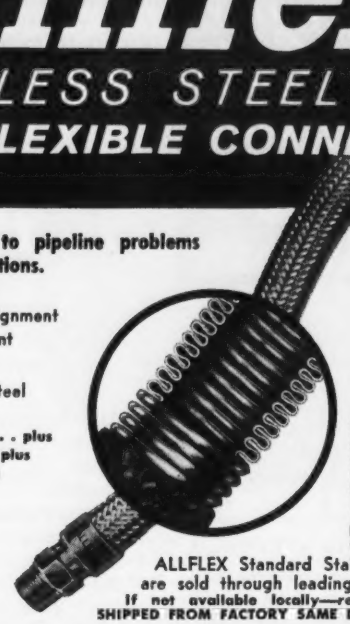
Solids, %	90 or more
Service-temperature range, °F	−50 to +225
Tack-free skin time @70°F, hr	less than 24
Shrinkage @ 70°F, %	less than 10
Weathered-caulk:	
Elongation, %	100 or more
Tensile strength, psi	100 or more
Hardness, Shore A	20

(Maintz caulking compound is product of West Chester Chemical Company, Box 39, West Chester, Pa.)

Check 3132 opposite last page.

Allflex

STAINLESS STEEL
"MNH" FLEXIBLE CONNECTORS



A NEW stock answer to pipeline problems caused by rigid connections.

- Dampens Vibration
- Compensates for Misalignment
- Permits Offset Movement
- Absorbs Expansion

With ALLFLEX Stainless Steel Connectors you get:

- **CORROSION RESISTANCE . . plus**
- **PRESSURE RESISTANCE . . plus**
- **HEAT RESISTANCE . . plus**
- **FLEXIBILITY**

Also available in Monel, Bronze and Steel.

WRITE TODAY for fact-filled ALLFLEX Bulletin

THESE STOCK SIZES
¼" ⅜" ½" ¾"
1" 1¼" 1½" 2"

IN THESE STOCK LENGTHS
12" 18" 24" 30"
36" 48" 60"

SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED. Also available in all standard sizes thru 16", in any required lengths, and with any special or standard end fitting or flange connections. Send your problems to Allied's Engineering Department. Let us suggest the best solution for your flexation problems.

ALLFLEX Standard Stainless Steel Connectors are sold through leading Industrial Distributors. **If not available locally—*remember*, THEY CAN BE SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED.**

ALLIED METAL HOSE COMPANY
3784 Ninth Street, Long Island City 1, N. Y. • Phone STillwell 4-5173

Check 3133 opposite last page.

GRIND BETTER BY
IMPACT

For closely controlled particle size reduction, minimum temperature rise, high abrasion resistance and low horsepower requirements with no grinding tolerances to maintain.

RECENT APPLICATION

Grinding raw glass scrap to 95% minus 16 mesh. Entoleter® Impact Mill with wear resistant impactors for economical tonnage processing of this extremely abrasive material.

- **Vibrating Screens**
- **Centrifugal Impact Mills and Mixers**

Send for complete literature.

Free test runs on your material.

ENTOLETER
DIVISION OF SAFETY INDUSTRIES, INC.
P. O. Box 904, New Haven, Conn.

Check 3134 opposite last page.

THAT'S INTERESTING

Open sesame

Use of one of three protective chemicals has been found to increase by more than 90 times the number of sesame seeds that will grow to a stand.

The chemicals used were captan, thiram or chloranil. Scientists of U. S. Department of Agriculture report no toxicity of plants was noted at concentrations used.

Pipeline mail

As part of the observance of oil's first 100 years, microfilmed letters were transported from Corsicana, Texas, to Titusville, Pa., via crude oil pipelines — a distance of 1250 miles.

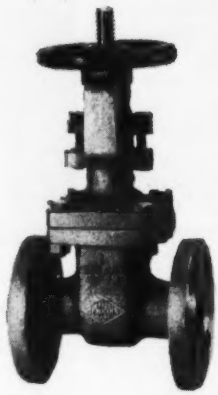
The microfilmed letters rode in a special container attached to a scraper which is passed through a pipeline intermittently, propelled by the flow of oil, to keep it free of deposits.

For more information on product at right, specify 3135 see information request blank opposite last page.

For 99 out of 100. . .

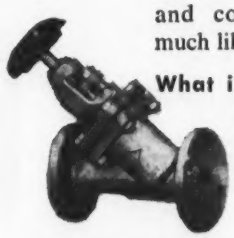
Selection of Stainless Steel Valves *can be as simple as selection of Bronze and Iron valves*

HOW to keep it simple? Don't let the wide selection of stainless steel alloys "throw you"!

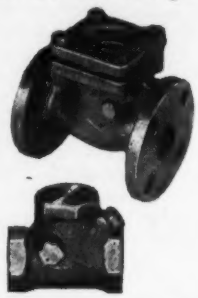


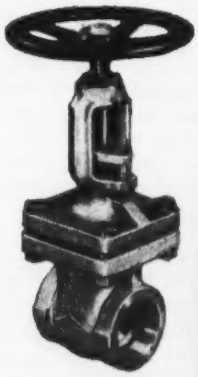
Most of the alloy specs were developed to meet certain highly specialized and rather uncommon needs. Only 1 out of 100 valve users can make practical use of many of the alloys. *Actually, just two or three of the different available alloys will give a big majority of valve users all they want and need.*

You can judge DESIGN differences between the various "makes" exactly as you do it with Bronze and Iron valves. Look them over and compare. Basically, of course, a Stainless Steel valve is designed and constructed very much like other valves.

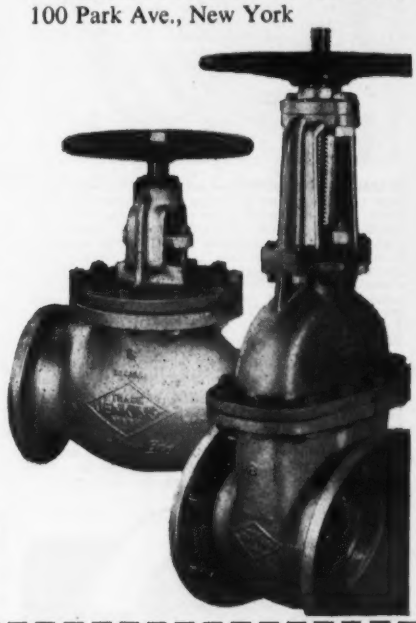


What is left to worry about in addition to Material and Design? The same factors you consider in buying ANY valves for long, dependable performance: Are the valves made merely good enough, or to a standard that demands an extra-measure of quality? How good are the castings? How precise and perfect is the machining? How rigid is the inspection and testing during manufacture? These are the factors which specs can't cover. Some of them you can't see when you look at the valve. But you KNOW how to make sure they measure-up to peak standards. You know that the name JENKINS VALVES and the famous Jenkins DIAMOND trademark have been the highest assurance of quality for nearly a century.





Specify *"Jenkins"* as well as the metal alloy to assure fullest satisfaction. Your Jenkins Distributor has patterns and alloys to satisfy most industrial needs. Of course, they meet valve industry specifications and the high standards established by leading users of stainless steel valves. Jenkins Bros., 100 Park Ave., New York



Jenkins Bros.
100 Park Ave., New York 17.
Send Jenkins Stainless Steel Valve Catalog to —

Name & Title.....

Company.....

Address.....

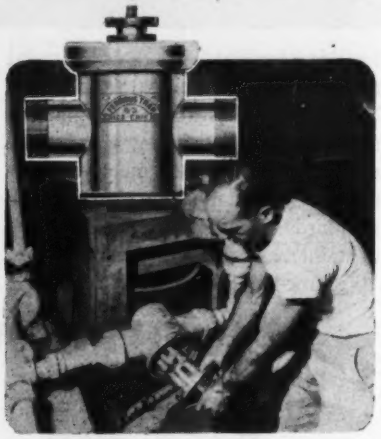
JENKINS VALVES

JENKINS SINCE 1864 Jenkins Bros

ELIMINATE
TRAMP
IRON
in liquid pipelines

ERIEZ

permanent non-electric
magnetic
FERROUS TRAPS



ULTIMATE PROTECTION against fine iron and tramp iron contamination for most liquid-handling pipelines. Ideal for installation in food, chemical and ceramic applications. Protect product purity. Increase production. Prevent abrasive wear; reduce damage to filters, mixers, pumps, etc. Made with strong, one-piece cast bodies, Ferrous Traps withstand pressures up to 150 psi. Provide greater magnetic area than all previous models. Effective with materials up to 750°F. Quickly pay for themselves. Two types: standard stainless steel models and highly polished sanitary models.

MAGNETIC STRENGTH IS GUARANTEED FOR LIFE • QUICKLY, EASILY INSTALLED IN ANY POSITION • CLEAN, SIMPLE DESIGN HAS NO MOVING PARTS • MAGNETIC ELEMENT LIFTS OUT IN SECONDS FOR INSPECTION OR CLEANING • ADAPTABLE FOR LINES FROM ½" to 4".

Free literature has complete installation and application information. Write today to:
Eriez Mfg. Co., 73-AA Magnet Dr., Erie, Pa.

ERIEZ

Check 3136 opposite last page.

Chemical Boobytraps

Unsuspected hazards
awaiting the unwary

Domestic-refrigerator use in chemical labs is dangerous

Refrigerators are often used in chemical laboratories for storage of volatile solvents (such as ether, benzene and pentane), unstable compounds (such as monomers and organic peroxides), and compressed and liquefied gases. All of these may produce explosive mixture inside the box.

Accordingly, it is important that there be no spark-producing elements in the refrigerator. In most domestic refrigerators following spark-producing sources of ignition are present:

1) Compressor motor, which is not of type approved for hazardous locations under Article 500 of the National Electrical Code.
2) Two-wire system, terminating in a service plug, may arc when plugged-in or unplugged under load.
3) Thermostat relay for cold control, which switches motor ON and OFF as required to maintain a desired temperature.
4) Interior lamp, with its door-operated switch.
5) Butter-cooler and related circuits.
6) Door latch or magnetic door closure, which may spark in opening or closing.

Unless domestic refrigerators are properly modified with respect to the above points, they are not satisfactory for laboratory service.

Even if "safe" refrigerators, designed for chemical storage, are used, regular program for inspection, defrosting and discarding of substances, which have lost their utility or identity, should be strictly observed. Quantity of materials which will decompose or burn should be kept at minimum at all times.

(Contributed by Howard H. Fawcett, Safety Director, Research Laboratory, General Electric Company, Schenectady, N.Y.)

Simultaneous frequencies clean ultransonically

Uses: Ultrasonic cleaning of gear trains, valves, porous metal filters and various complex mechanical assemblies.

Features: Cleaner incorporates use of several simultaneous ultrasonic frequencies. This combines advantages of both low and high frequencies.

Description: Ultrasonic cleaner runs at 400 kc with number of frequencies ranging down to 20 kc. Higher frequency removes dirt particles around one micron in size and penetrates into small crevices and recesses. Lower frequencies provide cleaning action required for larger dirt particles, and clean areas that are not accessible to high frequency because of shadowing.

Ultrasonic wash, rinse and drip-dry provide complete cleaning system. Cleaning containers, 12" in diameter by 12" deep, have 24-qt capacities. Barium titanate transducers are alternately driven by 700-w R-F generator. Pumps and filters are furnished for solvent recirculation and transfer. Units are stainless steel.

(VT-700 ultrasonic cleaner is product of McKenna Laboratories, 2503 Main St., Santa Monica, Calif.)

Check 3137 opposite last page.

Hopper Bopper

ERIEZ

HI-VI
BIN VIBRATORS

Here's the newest and most efficient answer to those hard-to-move materials in sticky bins . . . designed to provide superior operating efficiency . . . exclusive pinpointed vibration gets right to the trouble spot—starts stubborn materials moving!

NO RECTIFIER NEEDED • JUST PLUG OR WIRE INTO A.C. LINE • COMPLETELY ENCLOSED HOUSING ASSURES LONG TROUBLE-FREE LIFE • GREATER VIBRATION IMPACT THAN COMPARABLE SIZE UNITS • LOW FIRST COST • LOW OPERATING, MAINTENANCE COST.

Also available: Special Mill Mutual ACCEPTED Units for HAZARDOUS DUSTY LOCATIONS.

GET BIG VIBRATORY FACT FILE . . . WRITE TODAY.
Eriez Mfg. Co., 73-AB Magnet Dr., Erie, Pa.

UNSTICK
STUCK BINS

ERIEZ

Check 3138 opposite last page.

NEW LITERATURE

Plant Engineering

Maintenance & Safety

Chemical-plant safety is covered in 24-page manual, which is composite of supervisor-employee ideas concerning safety, in addition to established safety principles. Discussion of accident-prevention fundamentals is included along with treatment of such subjects as in-plant personal production, emergency care and machine accidents. "Safety"—Industrial Relations Department, American Viscose Corporation.

Check 3139 opposite last page.

Dielectric materials' properties (at microwave frequencies over wide range of dielectric constant and dissipation factor) are presented in chart form, in color, by Dielectric Materials Chart — Emerson & Cuming, Inc.

Check 3140 opposite last page.

Mechanical packings are clarified in 64-page catalog which contains information about complete line. Text is supplemented by variety of photos, illustrations and specification charts and tables. Table of contents is included, in addition to numerical and alphabetical indexing page on inside back of cover. Form PK-131A—Johns-Manville.

Check 3141 opposite last page.

Valved couplings, for use with fuels and other fluids with working pressures to 3000 psi and temperatures to 400°F, are listed in four-page Cat 280B—Snap-Tite, Inc.

Check 3142 opposite last page.

Packaged automatic boilers are featured in 12-page bulletin, which gives ratings and dimensions of all sizes in line as well as details of burners. Powermaster Model 3 Boiler Bul—Orr & Sembower, Inc.

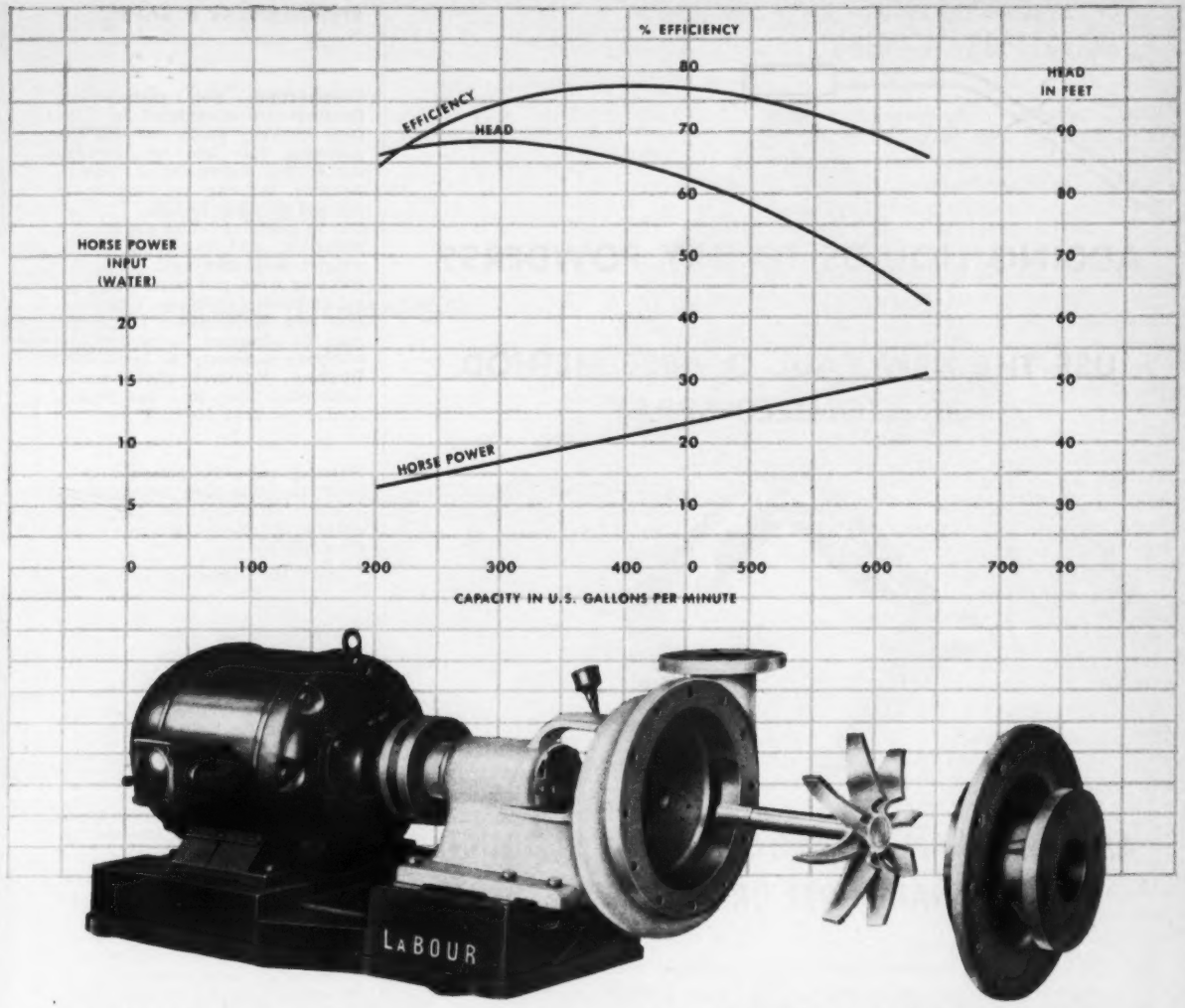
Check 3143 opposite last page.

Sight-glasses memorandum outlines recommendations to eliminate indiscriminate use of sight glasses and offers alternative solutions. Sight Glass Memorandum —Artisan Metal Products, Inc.

Check 3144 opposite last page.

AC, DC motors and generators are treated in six-page brochure which covers squirrel-cage AC motors, special-purpose motors, wound-rotor motors, DC motors, generators, and motor-generator sets. Motor-generator Brochure—Imperial Electric Company.

Check 3145 opposite last page.



And it's done with an *OPEN IMPELLER*

There's no need to give up the many advantages of open impeller pumps for chemical service, in order to obtain higher efficiency. This curve, the actual record of a LaBour No. 20 Type SQ pump, is typical.

Because the performance of a LaBour pump is not dependent upon close clearances inside the casing, substantial increases in clearances have little effect. That's why, even after long, hard service, LaBour pumps *continue* to deliver relatively high efficiency.

We'll be glad to explain why it's to your advantage to insist on fully open impellers, and to insist on LaBour pumps for efficiency without sacrifice of those advantages. Write us today.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

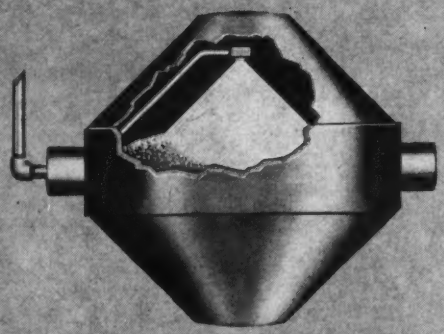
LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U.S.A.

Check 3146 opposite last page.

ADDING LIQUIDS TO DRY POWDERS?

USE THE NEW PAUL O. ABBÉ METHOD OF ATOMIZED SPRAY



ASSURES COMPLETE UNIFORMITY OF PRODUCT, ELIMINATES WET OR DRY AREAS.

If your mixing operation calls for the addition of a liquid to a free-flowing material, check the Paul O. Abbé method of atomized spray blending. This method employs a Paul O. Abbé Rota-Cone Blender with a special atomizing spray attachment. Constant tumbling action insures a thorough, efficient economical and completely uniform blend. At the same time, the tumbling action exposes all portions of the dry batch to the liquid additive, which is sprayed over the dry batch in the form of a fine mist.

Wetting is exceptionally uniform and formulation of wet spots or lumps is prevented in almost all material. This eliminates the need of an internal agitator, in most cases, thereby cutting equipment costs, reducing maintenance and simplifying cleaning between batches. For those materials which require the additional action of an internal agitator, this can be provided in conjunction with the atomizing spray attachment.

Let us blend a sample batch of your material in our laboratory and return it to you for your evaluation without obligation.

Write for complete data.

PAUL O. ABBE

402 Center Avenue — Little Falls, New Jersey

BALL & PEBBLE MILLS
DRY & PASTE MIXERS
DRYERS & BLENDERS

Check 3147 opposite last page.

ENGINEERING & SAFETY

Construction and maintenance products are considered in 128-page booklet, which contains engineering data and specifications concerning waterproofing, dampproofing, painting, caulking, roofing and flooring. Included in book are 36 pages of tables and charts, materials, estimating guide, weights and measures, paint and concrete work and other pertinent information. Building Construction and Maintenance Handbook may be obtained by writing on company stationery to Dept. HB, Building Products Division, L. Sonneborn Sons, Inc., 404 Fourth Ave., New York 16, N. Y.

Slip-stem-valve operators are specified in eight-page Specification S1016-2—Industrial Division, Minneapolis-Honeywell Regulator Company.

Check 3148 opposite last page.

Centrifugals are subject of four-page bulletin, which describes various aspects of suspended, perforated-basket type. "Centrifugals For The CPI"—The Western States Machine Company.

Check 3149 opposite last page.

Air motors and packaged work units based on these motors are pictured in 16-page Bul ML-5 — The Bellows Company.

Check 3150 opposite last page.

Grinding rods of synthetic-sapphire substance in bond (composed of specially prepared fine-grained crystals of aluminum oxide held together by a non-metallic vitreous bond) are depicted in four-page Diamonite Brochure — Diamonite Products Manufacturing Co., Division of U. S. Ceramic Tile Company.

Check 3151 opposite last page.

Pump standardization, achieved with vertical single-stage models, covering range of 1, 1½, 2, 3 and 4" pumps, is considered in six-page Veriflow Pump Folder—United Centrifugal Pumps.

Check 3152 opposite last page.

Safety-glass line is delineated in 12-page catalog, which includes diagrams of construction details of various types. Cat S-8582—Safety Products Division, American Optical Company.

Check 3153 opposite last page.

Portable air sampler, employing turbine-type blower, is presented in Brochure IH-4, which is available by means of letterhead request to Air Sampler Division, The Staplex Company, 777 Fifth Ave., Brooklyn 32, N.Y.

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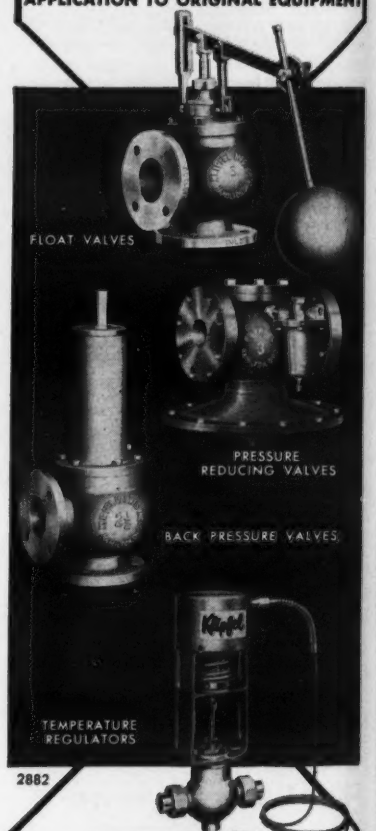

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Check 3154 opposite last page.

Refrigerated purging is expanded upon in 12-page bulletin which presents data on automatic removal of air from refrigeration systems. Bulletin considers such points as necessity of purging, how non-condensible gases affect efficiency, method of purging, location of purge connections and use of refrigerated purger. Bul 700—Armstrong Machine Works.

Check 3155 opposite last page.

Bronze, iron centrifugal pumps, with capacities to 320 gpm for pressures to 40 psi, are clarified in six-page bulletin which includes list of uses. Bul 1004 — Marine Products Company.

Check 3156 opposite last page.

Felt pipe insulation which can be easily installed is discussed in four-page bulletin, including photographs and specifications. Tab-Lok Bul—The Eagle-Picher Company.

Check 3157 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Free-piston pump is specified in four-page folder. Principle of operation is explained and diagramed. Free-piston Pump Folder —The Crossley Machine Company.

Check 3158 opposite last page.

Solenoid-valve specification may be expedited through use of eight-page booklet, which incorporates sections on solenoid-valve nomenclature and on various characteristics. "How To Specify Solenoid Valves"—Valcor Engineering Corporation.

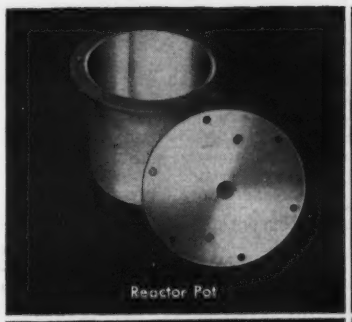
Check 3159 opposite last page.

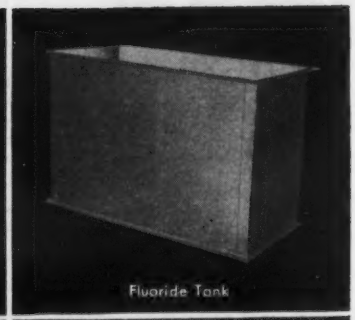
Ultrasonic-cleaning information is summarized in 12-page pamphlet which covers ultrasonic cleaning in general, how it works, areas in which it can be employed and various solvents and detergents available for use with this type of equipment. "Ultrasonic Cleaning Primer"—National Ultrasonic Corp.

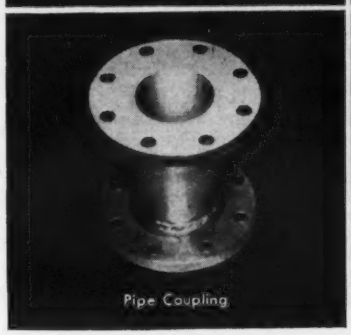
Check 3160 opposite last page.

Toxicological reviews, on copper naphthenate, naphthalene, naphthenic acids and butadiene are now available from American Petroleum Institute, 50 W. 50th St., New York 20, N.Y., at 25c per copy.

TEFLON*
SHEET
TANK LININGS







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The Barber-Webb Company, Inc.,
Los Angeles, Calif.

Belke Mfg. Co., Inc.,
Chicago, Illinois

Buckley Iron Works,
Dorchester, Mass.

Electro-Chemical Engr. & Mfg. Co.,
Emmaus, Pa.

Linco, Inc.,
Houston, Texas

Mercer Rubber Corp.,
Little Ferry, N. J.

Metalweld, Inc.,
Philadelphia, Pa.

GARLOCK

You can also obtain details on Teflon Linings by writing to Special Products Dept., The Garlock Packing Company, Camden 1, New Jersey.

*DuPont Trademark for TFE Fluorocarbon Resin

Check 3161 opposite last page.

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Check 3162 opposite last page.

ENGINEERING & SAFETY

Compressed air is considered in 16-page booklet which is aid in selection of small packaged air compressors. Booklet describes compressed air, how it is compressed, single- and two-stage compressors, piston displacement, actual delivery, unloading of compressors, regulation and types of control used. Form 1548 — Ingersoll-Rand Company.

Check 3163 opposite last page.

Expansion joints are covered in six-page brochure, which is brief digest of information on nomenclature and selection of expansion joints. Expansion Joint Brochure — Expansion Joint Division, Badger Manufacturing Company.

Check 3164 opposite last page.

High-vacuum valves, baffles and traps are delineated in eight-page bulletin, which includes detailed drawings, dimensional data and pictures. High-vacuum Valve Bul —Rochester Division, Consolidated Electrodynamics Corp.

Check 3165 opposite last page.

Silicone-rubber-coated fabrics, for thin gasketing, diaphragms, seals and similar applications, are outlined on single-page technical data sheet, "Stock Item Coated Fabrics"—The Connecticut Hard Rubber Company.

Check 3166 opposite last page.

Refrigerating and air-conditioning applications of expandable polystyrene are illustrated by means of charts and pictures in six-page Dylite Bul C-9-271—Plastics Division, Koppers Company, Inc.

Check 3167 opposite last page.

Floor mats, tile and stair treads, produced from composition of rubber with reinforcing Nylon synthetic fiber, are pictured in four-page Nyracord Bull — American Mat Corporation.

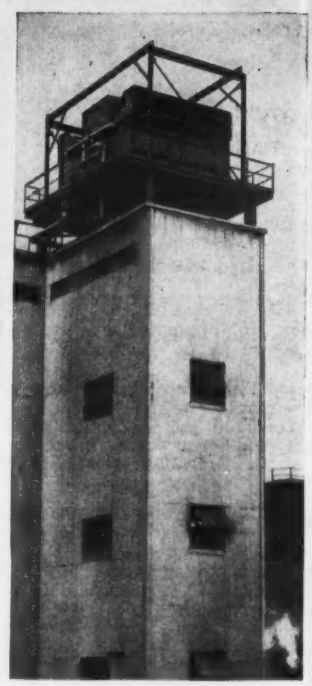
Check 3168 opposite last page.

Reinforced-plastic-fabrications standards are outlined in six-page brochure which covers terms of new visual standards as well as most advanced materials specifications, including physical properties. Reinforced-plastic Standards —The Ceilcote Company.

Check 3169 opposite last page.

Electric-clip line, from miniaturized type to welding ground clamps, made of solid copper and cadmium-plated steel with flexible dielectric insulators to fit, are tabulated in eight-page Cat 220—Mueller Electric Company.

Check 3170 opposite last page.



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Check 3171 opposite last page.

recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Fuel and lubricant field is surveyed in a 312-page book. In this volume Milosh Popovich, of Oregon State College, and Carl Hering, of the U. S. Naval Postgraduate School, summarize material from many sources. Emphasis is on correlation between properties of fuels and lubricants and their performance in an engine or machine. Also considered extensively is significance of standard tests that are conducted on these materials. To obtain "Fuels and Lubricants," remit $8.50 to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y.

Check 3172 opposite last page.

Colloid chemistry is the subject of this 475-page volume by Karol J. Mysels, Chemistry Department, University of California, Los Angeles, Calif. It presents a concise survey of a field often neglected in academic careers. It is addressed to those who wish to acquire a broad acquaintance with colloids and gain an insight into the basic factors responsible for observed phenomenon.

To help reader check his grasp of the subject, problems are provided at the end of the chapters. To obtain introduction to "Colloid Chemistry" remit $10 to Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N.Y.

Check 3173 opposite last page.

"Hello, U. S. Army? I've just developed a hen that lays powdered eggs!"

"Silicones," authored by Robert N. Meals and Frederick M. Lewis of Silicone Products Department, General Electric Company, is the 11th of a series published as a guide to application of plastics. Manufacture, properties, and applications of the silicones are treated, with data given on properties of silicone resins, fluids and rubbers at high temperatures.

Book is aimed at design engineers, formulators and manufacturers in all industries who might have interest in silicones as engineering and raw materials. As with other books in the series, a special chapter is devoted to future prospects. To obtain "Silicones" remit $5.95 to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, New York.

On-stream analysis is aim of equipment detailed in recent book by Sidney Siggia, Manager, Analytical Service, Research, Olin Mathieson Chemical Corporation. Details are presented on all phases of analytical devices designed to attain economical, accurate and continuous monitoring of chemical process systems. Devices investigated are continuous on-stream analytical instruments functioning automatically and directly in processing equipment or pipelines.

"Continuous Analysis of Chemical Process Systems" is available from John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, New York.

Check 3174 opposite last page.

Gas chromatography developments, particularly those that have appeared since 1957, form the highlight of this second edition. Columns having an extremely large number of theoretical plates and new, highly sensitive detection systems are among the most important additions. Authored by A. I. M. Keulemans, Research Chemist, Koninklijke/Shell-Laboratorium, Amsterdam, Holland, this concise volume spells out both the practical and theoretical aspects of gas-liquid and gas-solid chromatography.

To obtain "Gas Chromatography, Second Edition" remit $7.50 direct to Reinhold Publishing Corporation, 430 Park Ave., New York 22, N. Y.

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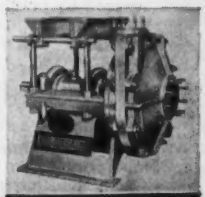

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SP 511

Check 3175 opposite last page.

manufacturers' current literature

This section features a variety of literature currently available from manufacturers. See also the other sections in this issue for new literature pertaining to those particular sections

Petrochemical equipment of various types, including that for electrical generation, distribution and utilization; pumps (rotary, centrifugal and vacuum); mechanical power-transmission equipment; processing machinery (mills, kilns and screens); water-conditioning systems; and material-handling equipment, is depicted in Petrochemical Equipment Literature—Allis-Chalmers Manufacturing Company.

Check 3176 opposite last page.

Visual control, which gives graphic picture of operations in color, is presented in 24-page Booklet AA-40—Graphic Systems.

Check 3177 opposite last page.

Processing Equipment

Attrition scrubbers, with rubber-lined or acid-proof tanks in sizes to 56 × 56″, in standard (A-8505) or lab and pilot-scale (LG3-B10) lines, are listed in Buls A-8505 and LG3-B10—Denver Equipment Company.

Check 3178 opposite last page.

Filter media, such as frameless metal-edge elements, fused porous-metal type and fibrous-metallic style, are included in material covered by brochures, "New Roles for Filtration" and "Filter Media Selection Chart"—Purolator Products, Inc.

Check 3179 opposite last page.

Filtration equipment of all types is incorporated in six-page bulletin, which is illustrated with photographs. Bul GEN-58—Industrial Filter & Pump Mfg. Co.

Check 3180 opposite last page.

Ball and rod mills, available with ceramic or rubber linings in sizes to 10 x 20′, in standard (B2-B20) and lab and pilot-scale (LG3-B10) models, are detailed in Buls B2-B20 and LG3-B10 — Denver Equipment Company.

Check 3181 opposite last page.

Jaw crushers, incorporating cast-steel frames, anti-friction side bearings and bumper bearings, in size range of 2¼ x 3½″ to 36 x 48″, in both standard (C12-B12) and lab and pilot-scale (LG3-B10) styles, are discussed in Buls C12-B12 and LG3-B10 — Denver Equipment Company.

Check 3182 opposite last page.

Batch mixers, in hand- and motor-driven models for capacities of 5 qt to 160 cu ft, are treated in Bul X-19R—Industrial Division, Daffin Manufacturing Company.

Check 3183 opposite last page.

Screens, for wet or dry screening, are available in both standard (S3-B15) and lab and pilot-scale (LG3-B10) styles. They are clarified in Buls S3-B15 and LG3-B10 —Denver Equipment Company.

Check 3184 opposite last page.

Radiant-heat processing of batch liquids is considered in a bulletin which incorporates information on enclosed or open settings which are steel-encased and shipped with all refractory in place for simple installation. Packaged equipment may include shop-assembled pipe and complete automatic-control instrumentation. "Processing Batch Liquids"—Selas Corporation of America.

Check 3185 opposite last page.

Spray dryers for paper clays are outlined in Spray Dryer Bul—Nerco-Niro Spray Dryer Div., Nichols Engineering & Research Company.

Check 3186 opposite last page.

Spiral-rake thickeners, which move settled materials to center in one revolution, are available for both standard (T5-B6) and lab and pilot-scale (LG3-B10) use. They are expanded upon in Buls T5-B6 and LG3-B10—Denver Equipment Company.

Check 3187 opposite last page.

Flotation on both standard (F10-B86) and lab and pilot-scale (LG3-B10) levels, is subject of Buls F10-B86 and LG3-B10—Denver Equipment Company.

Check 3188 opposite last page.

Pelletizers, for handling polypropylene, polyethylene, polystyrene, nylon, vinyl, urea and natural and synthetic rubber, are detailed in Tech Buls 213, 216 and 217—Taylor, Stiles & Co.

Check 3189 opposite last page.

Centrifuges of vertical- and suspended-basket types are subject of Centrifuge Literature—Fletcher Centrifuges, Division of The Sharples Corporation.

Check 3190 opposite last page.

Agitators in various models, including turbine-type-propeller (to 120″ in tank to 50′ diam) slow-speed, high-speed, air-lift, vertical-turbine-mixer, and mixer-settler units, are listed in both standard (A2-B2) and lab and pilot-scale (LG3-B10) lines, are incorporated in Buls A2-B2 and LG3-B10—Denver Equipment Company.

Check 3191 opposite last page.

Dust collectors, which incorporate automatic bag cleaning, are specified in Cat 104—The W. W. Sly Manufacturing Co.

Check 3192 opposite last page.

Fluid mixers are expanded upon in Lightnin® Mixer Bul—Mixing Equipment Co., Inc.

Check 3193 opposite last page.

Conversion of fines to granules with complete processing circuit, incorporating compacting mill, roller-type granulating mill and vibrating screen, is covered in Bul 07B8836—Industrial Equipment Division, Allis-Chalmers Manufacturing Company.

Check 3194 opposite last page.

Kettles, tanks and pans are detailed in Kettle, Tank and Pan Literature—Lee Metal Products Company, Inc.

Check 3195 opposite last page.

Processing-equipment line, including blenders, dryers, mills, reactors, screens, kettles and mixers, among others, is specified in Bul C-603—The Patterson Foundry and Machine Co., Div. of Ferro Corp.

Check 3196 opposite last page.

Corrosion Control

Rubber and neoprene linings for corrosion protection are included in Rubber Lining Literature—Mills and Export Division, Goodall Rubber Company.

Check 3197 opposite last page.

Glassed-steel reactors, which are resistant to all acids (except hydrofluoric) and all mild alkalis, are available in capacities of 1 to 4000 gal. Data on these and other products and services, offered under program for handling and processing liquids and gases, are outlined in Bul 980—Pfaudler Permutit Inc.

Check 3198 opposite last page.

Pumps, of zirconium and Teflon for corrosive-acid service, are inventoried in Gearchem® Pump Cat—Eco Engineering Company.

Check 3199 opposite last page.

Rubber-lined pumps, in sizes to 5000 gpm and in both standard (P9-B10) and lab and pilot-scale (LG3-B10) models, are considered in Buls B9-B10 and LG3-B10—Denver Equipment Company.

Check 3200 opposite last page.

Plastisol coatings, which can be sprayed-or-dip-applied to provide seamless, pore-free shields against corrosives, are explained in Bul VP-3—Metal & Thermit Corp.

Check 3201 opposite last page.

Plastic pumps, which have neither stuffing box nor shaft seals, in capacity range of 1/3 to 40 gpm, are subject of Plastic Pump Cat—Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp.

Check 3202 opposite last page.

Cast iron exhausters, built to withstand severe corrosive conditions, are available with direct-motor drive, separate-belt drive or package unit with adjustable-pitch V-belt drive and motor mounted on adjustable base rails. Exhausters are detailed in Cast-iron Exhauster Information — Buffalo Pumps Div., Buffalo Forge Co.

Check 3203 opposite last page.

Globe and angle valves of stainless steel, which have free-swivel disc-stem connections to prevent seizing and galling on seats, are itemized in 18-8 SMo Valve Literature—Crane Co.

Check 3204 opposite last page.

Fume fans of resin-bonded fiberglass, which are suitable for temperature applications to 300° F and come in capacities to 34,000 cfm at pressures to 10″ static, are delineated in Bul FI-511—Buffalo Pumps Division, Buffalo Forge Company.

Check 3205 opposite last page.

Belt-driven axial fans, incorporating 10- and 12-gage drums and isolated, air-cooled, protected bearings and belts, are subject of Bul 620-CP—Propellair,® Division of Robbins & Myers, Inc.

Check 3206 opposite last page.

Thermoplastic tube, coatings, sheet materials and molded goods are highly resistant to chemical attack. Data and technical characteristics on these products are treated in Tygon Portfolio—Plastics and Synthetics Division, U.S. Stoneware.

Check 3207 opposite last page.

Rubber tank linings, constructed of multiple-calendered sheets of natural or synthetic rubber, are considered in Rubber Tank Lining Literature — Manhattan Rubber Division, Raybestos-Manhattan, Inc.

Check 3208 opposite last page.

Expansion joints, made of Teflon compound providing at least 300% elongation, are reviewed in Bul B-1A—Resistoflex Corp.

Check 3209 opposite last page.

Instrumentation and Laboratory Apparatus

Reagent feeders are available in both wet and dry types in standard (F6-B8) and lab and pilot-scale (LG3-B10) styles. They are cataloged in Buls F6-B8 and LG3-B10—Denver Equipment Company.

Check 3210 opposite last page.

Metering pumps, for handling small volumes of expensive or dangerous liquids and accurately metering them into large process streams, are treated in Bul 1257-1—Milton Roy Company.

Check 3211 opposite last page.

Base-metal thermocouple assemblies, which give reliable temperature readings for range of −300 to +2200°F, are covered in 16-page Cat E-5—Thermo Electric Co., Inc.

Check 3212 opposite last page.

Samplers, of continuous-mechanical and automatic types for dry-solution or slurry sampling, are available in standard (S1-B4) and lab and pilot-scale (LG3-B10) models. They are reviewed in Buls S1-B4 and LG3-B10—Denver Equipment Company.

Check 3213 opposite last page.

Gages, of reflex, transparent and special-service types, are incorporated in a catalog which includes technical data, selection chart, specifications and properties, and installation-maintenance instructions. Cat 36—Penberthy Manufacturing Company, Division of Buffalo-Eclipse Corporation.

Check 3214 opposite last page.

Bi-metal thermometers of all-stainless-steel construction are presented in Bi-metal Thermometer Literature—Daystrom-Weston Sales Division.

Check 3215 opposite last page.

Feed-rate controllers, which can control grinding-mill feed, operate on basis of grinding sound level. These units are covered in Cat 42A-13—Hardinge Company, Incorporated.

Check 3216 opposite last page.

Fluids Handling

Diaphragm pumps, incorporating nylon-reinforced rubber diaphragms and in capacities to 1000 gpm, are manufactured in standard (P8-B12) and pilot-scale (LG3-B10) lines. They are presented in Buls P8-B12 and LG3-B10—Denver Equipment Company.

Check 3217 opposite last page.

Small-diameter tube, in seamless, as-welded and welded-and-drawn types, available in stainless, Monel and Inconel, is summarized in Cat 102—Greenville Tubes, Inc.

Check 3218 opposite last page.

Steam-trap selection, installation and maintenance are incorporated in 44-page Steam Trap Book—Armstrong Machine Works.

Check 3219 opposite last page.

Sump pumps, available in hard iron, stainless steel, natural or synthetic rubber or plastic coverings, with direct or V-drive, are summarized in Sump Pump Bul—The Galigher Co.

Check 3220 opposite last page.

Pumpcup designs include conventional and 45° bevel types, in full range of sizes for all reciprocating-pump and cylinder requirements. These are delineated in Bul 5903—Darling Valve & Manufacturing Co.

Check 3221 opposite last page.

Vertical centrifugal pumps, with no packing glands or sealing water, in capacities to 450 gpm, for standard (P10-B5) and lab and pilot-scale (LG3-B10) lines, are depicted in Buls P10-B5 and LG3-B10—Denver Equipment Company.

Check 3222 opposite last page.

Joint-sealing compound for threads and flange surfaces is discussed in Leak Lock Literature—Highside Chemicals Incorporated.

Check 3223 opposite last page.

Steam traps, which continually test for condensate in line ahead of trap and operate to discharge as soon as it forms, are incorporated in bulletin, "The Why and How of Steam Trapping"—Yarnall-Waring Co.

Check 3224 opposite last page.

Tube fittings of any machinable metal or plastic, in sizes for 1/16 to 1" OD tube, are tabulated in Swagelok® Cat—Crawford Fitting Company.

Check 3225 opposite last page.

Spray nozzles, for use in various applications including acid chambers, air washing, desuperheating, gas scrubbing and spray drying, among others, are listed in Cat 1—Monarch Mfg. Works, Inc.

Check 3226 opposite last page.

Strainers, for removal and disposal of suspended particles from raw or process water and other liquids, in 2 to 48" pipe sizes, are delineated in Bul 500.1—S.P. Kinney Engineers, Inc.

Check 3227 opposite last page.

Plant Engineering and Maintenance

Waste-burner systems, in which wastes can be fed directly to burners, are explained in Waste Burner Literature—Thermal Research & Engineering Corp.

Check 3228 opposite last page.

Torque-wrench capacities can be stepped-up with use of multi-purpose adapters. These are outlined in Cat SD-77—P.A. Sturtevant Co.

Check 3229 opposite last page.

Concrete patch, which permits use of repaired area immediately, is considered in Instant-Use Brochure—Flexrock Company.

Check 3230 opposite last page.

Steam generators, available in both package-unit (PSG-3) and custom-installation (VF-FS-2) types, are discussed in Buls PSG-3 and VF-FS-2—Henry Vogt Machine Co.

Check 3231 opposite last page.

Metal buildings, incorporating design without posts or trusses to interfere with materials handling, in aluminum or galvanized steel, are specified in Metal Building Information—Butler Manufacturing Company.

Check 3232 opposite last page.

Thread-cutting oils are described in Thread-cutting Oil Bul—The Ridge Tool Company.

Check 3233 opposite last page.

Catalytic oxidation systems, and their use in cleaning up combustible pollutants, fumes and odors from processes, are considered in brochure, "Oxycat Systems"—Oxy-Catalyst, Inc.

Check 3234 opposite last page.

Electric heaters, of strip, tubular and cartridge types, are available in sheath materials and wattages to match almost any application to 1100° F. They are clarified in Cat 60—Edwin L. Wiegand Company.

Check 3235 opposite last page.

Treated-fabric work gloves, available in gauntlet, knit-wrist, band-top and safety-cuff styles in jumbo sizes with or without ventilated backs, are presented in Work Glove Cat—The Surety Rubber Company.

Check 3236 opposite last page.

Heat-indicating paint, which can be brushed or sprayed on as with ordinary paint, and which provides accurate measurement to with ±9° F in range of 104 to 2912° F, is described in Detecto Temp Bul—Princeton Division, Curtiss-Wright Corporation.

Check 3237 opposite last page.

Valves

Ram-type drain valves are designed so that, in the closed position, piston or ram extends up into tank, thus precluding outlet plugging. These valves are reviewed in Drain Valve Cat—Strahman Valves, Inc.

Check 3238 opposite last page.

General-purpose valves for service to 10,000 psi can be used for throttling, regulating or shut-off applications over temperature range of −40 to +200° F. They are one of many types covered in Cat GC959—Hoke Incorporated.

Check 3239 opposite last page.

Rubber-seat butterfly-valve line for 150-psi tight shut-off in size range of 4 through 20", is detailed in Butterfly Valve Literature—Henry Pratt Company, Inc.

Check 3240 opposite last page.

Globe and angle valves are specified in detail in four-page Bul L-475—The Bastian-Blessing Co.

Check 3241 opposite last page.

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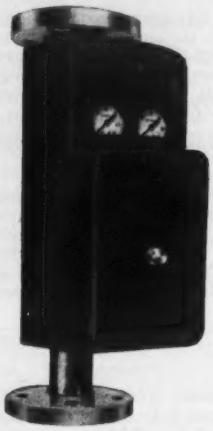

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Check 3242 opposite last page.

CURRENT LITERATURE

Lubricated plug valves are detailed in Cat 39-1—Homestead Valve Manufacturing Company.

Check 3243 opposite last page.

Plug-valve line, of jacketed, spring-loaded type, is treated in Bul J-57—Hetherington & Berner Inc.

Check 3244 opposite last page.

Flexible-valve technical data (FL-1116R) and uses (FL-935) are covered in Cats FL-1116R and FL-935—Farris Flexible Valve Corp.

Check 3245 opposite last page.

Valves, for use with pressure regulators, meters, reflux pumps, compressors and similar equipment, where repairs must be carried out from time to time, are delineated in Cat 58-B — Orbit Valve Company.

Check 3246 opposite last page.

Chemical Materials

Silicone defoamers, which can be obtained in spray cans for quick defoaming of smaller batch processes, are considered in Defoamer Literature—Dow Corning Corp.

Check 3247 opposite last page.

Tributyl phosphate's uses in various capacities are covered in three bulletins, TBP Solvent-extraction Bul, TBP Foam-reduction Bul and TBP Heat-exchanger Bul—Industrial Chemicals Department, Commercial Solvents Corporation.

Check 3248 opposite last page.

Solvent, coupler, plasticizer and diluent choice can be aided by six-page booklet, "Solvent Selector"—Union Carbide Chemicals Company, Division of Union Carbide Corporation.

Check 3249 opposite last page.

Sodium chlorate, benzyl chloride, benzoyl chloride and muriatic acid are specified in the brochures, Sodium Chlorate, Benzyl Chloride, Benzoyl Chloride and Muriatic Acid Tech Data—Hooker Chemical Corporation.

Check 3250 opposite last page.

2, 4-Pentanedione (acetylacetone) reacts with numerous metals and oxides to form effective chelating agents. Information on this and other chemicals is contained in booklet, Synthetic Organic Chemicals-1959—Union Carbide Chemicals Company, Division of Union Carbide Corporation.

Check 3251 opposite last page.

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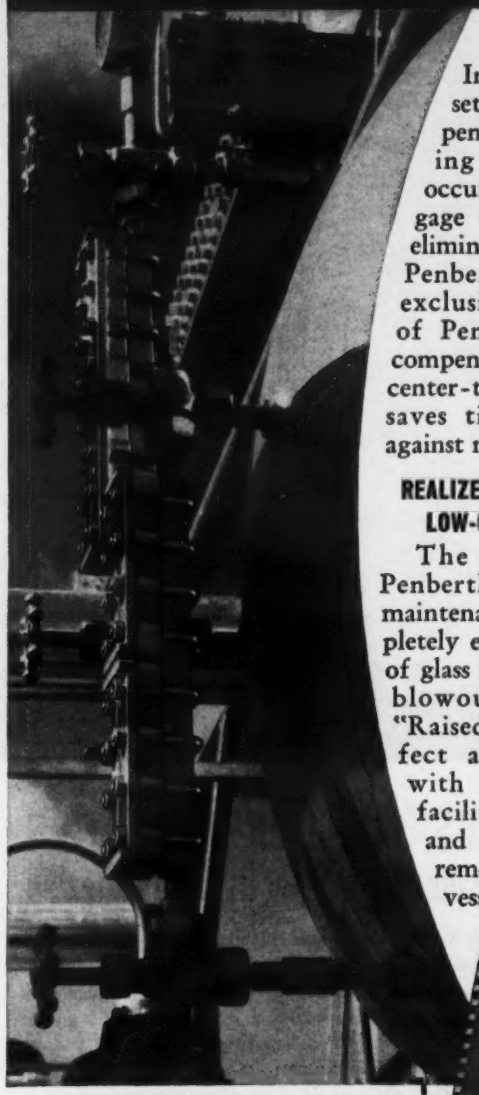

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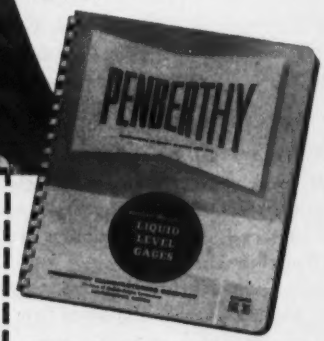

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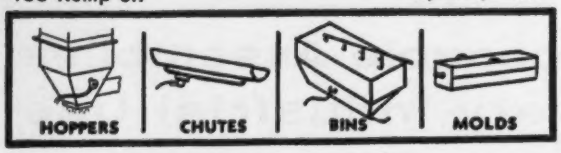

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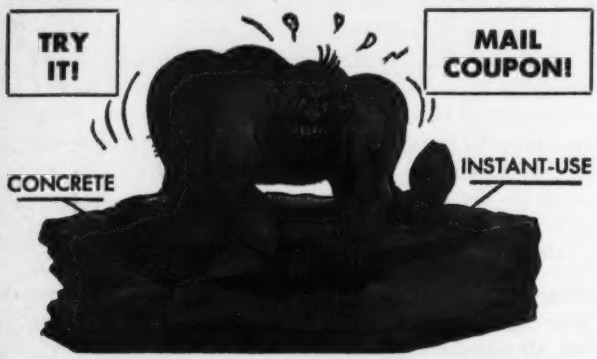

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Check 3256 opposite last page.

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Tin chemicals can provide electro-conductance, for heating or phosphor-excitation on glass, ceramics or other non-conductors, or controlled-conductance characteristics for electronic applications such as grid leaks and rectifiers. Summary of patents and literature on tin compounds in electro-conductive coatings is contained in Tin Compounds Patents-Literature—Metal & Thermit Corp.

Check 3257 opposite last page.

ε-Caprolactam properties, known reactions, suggested uses and comprehensive bibliography are included in 34-page Tech Bul I-14R —National Aniline Division, Allied Chemical Corporation.

Check 3258 opposite last page.

Silica gel adsorbents are specified in Silica Gel Literature—Davison Chemical Division, W.R. Grace & Co.

Check 3259 opposite last page.

Material Handling and Packaging

Mobilized gas-storage systems, which incorporate seamless-steel pressure vessels, normalized for safety and manufactured to ICC 3A2400 specifications, are detailed in Cat 58—Harrisburg Steel Co., Division of Harsco Corporation.

Check 3260 opposite last page.

Mechanized storage structures of glassed steel, which have mechanical bottom unloaders, can be incorporated into pneumatic or mechanical conveying systems. They are explained in Bul MU-100—A.O. Smith Corporation.

Check 3261 opposite last page.

Closed-belt conveyor - elevators, which convey and elevate by continuously wrapping material in package, moving package and contents to new location, and unwrapping, are presented in Bul 349 —Engineering Division, Stephens-Adamson Mfg. Co.

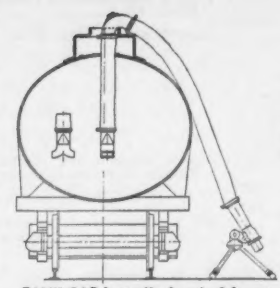
Check 3262 opposite last page.

Lined steel shipping containers, in which lining thickness is controlled to within ±1/10 mil, are detailed in Lined Steel Container Information—Rheem Manufacturing Company.

Check 3263 opposite last page.

Steel containers, in sizes of 1 through 55 gal and in various styles, closures and linings, are tabulated in Steel Container Cat—Vulcan Containers Inc.

Check 3264 opposite last page.



TANK CAR is easily freed of fumes for workers' safety.

CHEMICAL STILL is here ventilated while being repaired.

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Other "Blue Ribbon" Products in *Chemical Engineering Catalog, Refinery Catalog, Best's Safety Directory* and *Mining Catalogs.*

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BETTER PERFORMANCE

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Because they are "engineered" for their job—in precisely controlled textures, shapes and types—and are noted for outlasting other packings at least 3 to 1! Why not get the advantage of this tremendous saving in maintenance and down-time?

Pumcup designs include the conventional and 45° bevel types in a full range of sizes for all reciprocating pump and cylinder requirements.

Get all the facts

Send today for helpful Bulletin No. 5903.

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DARCOVA

TRADE MARK PUMCUPS

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If you want more information on processes, materials, controls, or other developments discussed herein, as you read this issue, ask our READER SERVICE DEPARTMENT . . . use this sheet

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JANUARY 1960

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☐ 2738	☐ 2782*	☐ 2826	☐ 2870	☐ 2914	☐ 2958*
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☐ 2740	☐ 2784	☐ 2828	☐ 2872	☐ 2916	☐ 2960
☐ 2741	☐ 2785	☐ 2829	☐ 2873	☐ 2917	☐ 2961
☐ 2742	☐ 2786	☐ 2830	☐ 2874	☐ 2918	☐ 2962
☐ 2743	☐ 2787*	☐ 2831	☐ 2875	☐ 2919	☐ 2963
☐ 2744	☐ 2788	☐ 2832	☐ 2876	☐ 2920	☐ 2964
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☐ 2746	☐ 2790	☐ 2834	☐ 2878	☐ 2922	☐ 2966
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☐ 2748	☐ 2792	☐ 2836	☐ 2880	☐ 2924	☐ 2968*
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☐ 2750*	☐ 2794	☐ 2838	☐ 2882	☐ 2926	☐ 2970
☐ 2751	☐ 2795	☐ 2839	☐ 2883	☐ 2927	☐ 2971
☐ 2752	☐ 2796	☐ 2840	☐ 2884	☐ 2928	☐ 2972
☐ 2753	☐ 2797	☐ 2841	☐ 2885	☐ 2929*	☐ 2973
☐ 2754	☐ 2798	☐ 2842	☐ 2886	☐ 2930	☐ 2974
☐ 2755	☐ 2799	☐ 2843	☐ 2887	☐ 2931	☐ 2975
☐ 2756	☐ 2800	☐ 2844	☐ 2888	☐ 2932	☐ 2976
☐ 2757	☐ 2801	☐ 2845	☐ 2889	☐ 2933	☐ 2977
☐ 2758	☐ 2802	☐ 2846	☐ 2890	☐ 2934	☐ 2978
☐ 2759	☐ 2803	☐ 2847	☐ 2891	☐ 2935	☐ 2979
☐ 2760	☐ 2804	☐ 2848	☐ 2892	☐ 2936	☐ 2980
☐ 2761	☐ 2805	☐ 2849	☐ 2893	☐ 2937	☐ 2981
☐ 2762	☐ 2806	☐ 2850	☐ 2894	☐ 2938	☐ 2982
☐ 2763	☐ 2807	☐ 2851	☐ 2895	☐ 2939	☐ 2983
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☐ 2769	☐ 2813	☐ 2857	☐ 2901	☐ 2945	☐ 2989
☐ 2770	☐ 2814	☐ 2858	☐ 2902	☐ 2946	☐ 2990
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☐ 2773	☐ 2817	☐ 2861	☐ 2905	☐ 2949	☐ 2993
☐ 2774	☐ 2818	☐ 2862	☐ 2906	☐ 2950	☐ 2994
☐ 2775	☐ 2819	☐ 2863	☐ 2907	☐ 2951	☐ 2995
☐ 2776	☐ 2820	☐ 2864	☐ 2908	☐ 2952	☐ 2996
☐ 2777	☐ 2821	☐ 2865	☐ 2909	☐ 2953	☐ 2997
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☐ 3003	☐ 3048	☐ 3093	☐ 3138	☐ 3183	☐ 3228
☐ 3004	☐ 3049	☐ 3094	☐ 3139	☐ 3184*	☐ 3229
☐ 3005	☐ 3050	☐ 3095	☐ 3140	☐ 3185	☐ 3230
☐ 3006	☐ 3051	☐ 3096	☐ 3141	☐ 3186	☐ 3231*
☐ 3007	☐ 3052	☐ 3097	☐ 3142	☐ 3187*	☐ 3232
☐ 3008	☐ 3053	☐ 3098	☐ 3143	☐ 3188*	☐ 3233
☐ 3009	☐ 3054	☐ 3099	☐ 3144	☐ 3189	☐ 3234
☐ 3010	☐ 3055	☐ 3100	☐ 3145	☐ 3190	☐ 3235
☐ 3011	☐ 3056	☐ 3101	☐ 3146	☐ 3191*	☐ 3236
☐ 3012	☐ 3057	☐ 3102	☐ 3147	☐ 3192	☐ 3237
☐ 3013	☐ 3058	☐ 3103	☐ 3148	☐ 3193	☐ 3238
☐ 3014	☐ 3059	☐ 3104	☐ 3149	☐ 3194	☐ 3239
☐ 3015	☐ 3060	☐ 3105	☐ 3150	☐ 3195*	☐ 3240
☐ 3016	☐ 3061	☐ 3106	☐ 3151	☐ 3196	☐ 3241
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☐ 3019	☐ 3064	☐ 3109	☐ 3154	☐ 3199	☐ 3244
☐ 3020	☐ 3065	☐ 3110	☐ 3155	☐ 3200*	☐ 3245*
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☐ 3022	☐ 3067	☐ 3112	☐ 3157	☐ 3202	☐ 3247
☐ 3023	☐ 3068	☐ 3113	☐ 3158	☐ 3203	☐ 3248*
☐ 3024	☐ 3069	☐ 3114*	☐ 3159	☐ 3204	☐ 3249
☐ 3025	☐ 3070	☐ 3115	☐ 3160	☐ 3205	☐ 3250*
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☐ 3028	☐ 3073	☐ 3118	☐ 3163	☐ 3208	☐ 3253
☐ 3029	☐ 3074	☐ 3119*	☐ 3164	☐ 3209	☐ 3254
☐ 3030	☐ 3075	☐ 3120	☐ 3165	☐ 3210*	☐ 3255
☐ 3031	☐ 3076	☐ 3121	☐ 3166	☐ 3211	☐ 3256
☐ 3032	☐ 3077	☐ 3122*	☐ 3167	☐ 3212	☐ 3257
☐ 3033	☐ 3078	☐ 3123	☐ 3168	☐ 3213*	☐ 3258
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☐ 3035	☐ 3080	☐ 3125	☐ 3170	☐ 3215	☐ 3260
☐ 3036	☐ 3081	☐ 3126	☐ 3171	☐ 3216	☐ 3261
☐ 3037	☐ 3082	☐ 3127*	☐ 3172	☐ 3217*	☐ 3262
☐ 3038	☐ 3083	☐ 3128	☐ 3173	☐ 3218	☐ 3263
☐ 3039	☐ 3084	☐ 3129	☐ 3174	☐ 3219	☐ 3264
☐ 3040	☐ 3085	☐ 3130	☐ 3175	☐ 3220	☐ 3265
☐ 3041	☐ 3086	☐ 3131	☐ 3176	☐ 3221	☐ 3266
☐ 3042	☐ 3087	☐ 3132	☐ 3177	☐ 3222*	☐ 3267
☐ 3043	☐ 3088	☐ 3133	☐ 3178*	☐ 3223	☐ 3268
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For more information on product at right, specify 3267 see information request blank opposite last page.

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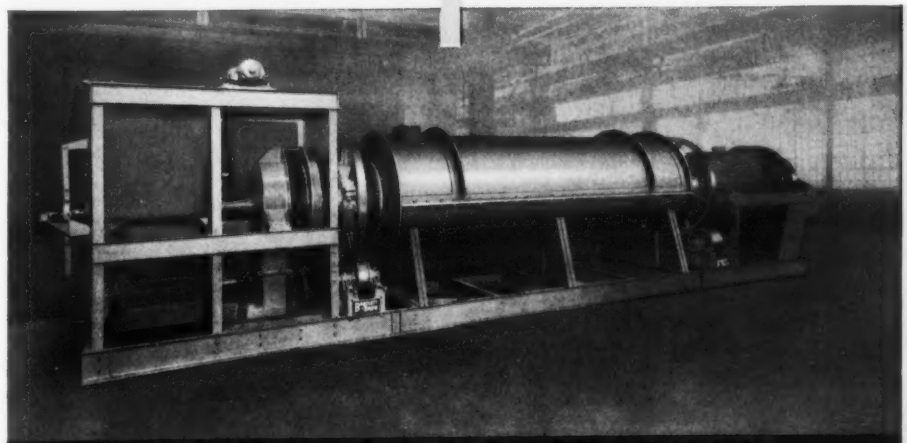
for processing at temperatures up to 2100° F.



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